Kramer Electronics, Ltd.

USER MANUAL

Model:

VP-4x8AK

4x8 VGA / UXGA / Audio Matrix Switcher

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1 Introduction

Welcome to Kramer Electronics! Since 1981, Kramer Electronics has been providing a world of unique, creative, and affordable solutions to the vast range of problems that confront the video, audio, presentation, and broadcasting professional on a daily basis. In recent years, we have redesigned and upgraded most of our line, making the best even better! Our 1,000-plus different models now appear in 11 groups[1] that are clearly defined by function.

Congratulations on purchasing your **VP-4x8AK** *4x8 VGA / UXGA / Audio Matrix Switcher*, which is ideal for the following typical applications:

- Professional display systems requiring a true 4x8 computer graphics and audio matrix operation
- Multimedia and presentation source, and acceptor selection

The package includes the following items:

- **VP-4x8AK** *4x8 VGA / UXGA Matrix Switcher*
- Windows®-based Kramer control software[2]
- Kramer **RC-IR3** Infrared Remote Control Transmitter (including the required battery and a separate user manual[4])
- Power cord[3], rack "ears" and this user manual[4]

2 Getting Started

We recommend that you:

- Unpack the equipment carefully and save the original box and packaging materials for possible future shipment
- Review the contents of this user manual
- Use Kramer high performance high-resolution cables[5]

2.1 Quick Start

This quick start chart summarizes the basic setup and operation steps.

1 GROUP 1: Distribution Amplifiers; GROUP 2: Switchers and Matrix Switchers; GROUP 3: Control Systems; GROUP 4: Format/Standards Converters; GROUP 5: Range Extenders and Repeaters; GROUP 6: Specialty AV Products; GROUP 7: Scan Converters and Scalers; GROUP 8: Cables and Connectors; GROUP 9: Room Connectivity; GROUP 10: Accessories and Rack Adapters; GROUP 11: Sierra Products

2 Downloadable from our Web site at http://www.kramerelectronics.com

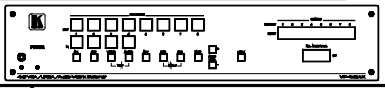
3 We recommend that you use only the power cord that is supplied with this machine

4 Download up-to-date Kramer user manuals from our Web site at http://www.kramerelectronics.com

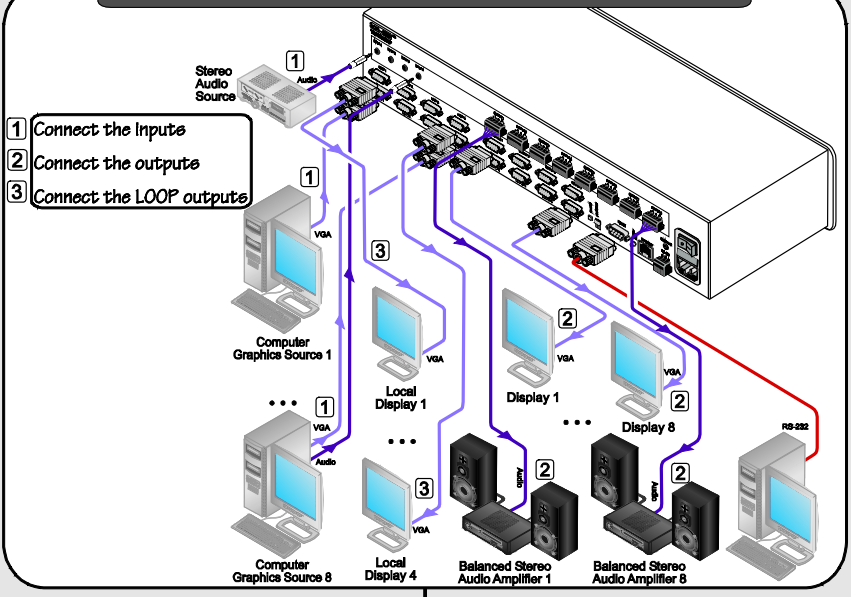
5 The complete list of Kramer cables is on our Web site at http://www.kramerelectronics.com

Step 1: Mount the machine - see section 5

Mount the machine in a rack or stick the 4 rubber feet to the underside



Step 2: Connect the inputs and outputs - see section 6



Step 3: Turn the power ON

Step 4: Operate the machine - see section 7

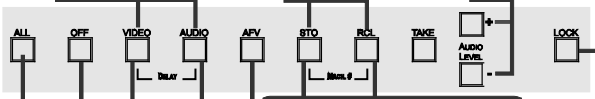
Use the SELECTOR buttons to switch the inputs to the outputs

Press VIDEO and AUDIO to set the DELAY time

Press STO and RCL to set the MACH #

Increase or decrease the AUDIO LEVEL

LOCK the front panel

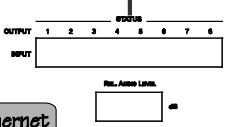


Connect a selected input to ALL the outputs; disconnect an output (OFF) from an input

Store (STO) and recall (RCL) the status

AFV - Audio follows video when switching
VIDEO - Switching relates to the video signal
AUDIO - Switching relates to the audio signal

Read the STATUS and the REL AUDIO LEVELon the 7-segment displays



Operate via the front panel buttons, RS-232, RS-485 and the Ethernet

3 Overview

The **VP-4x8AK** is a high performance 4x8 computer graphics video matrix switcher for high-resolution video and stereo audio signals. The **VP-4x8AK** is HDTV compatible and lets you simultaneously route any or all of the four inputs to any or all of the eight outputs and to loop each input to an additional output.

In particular, the **VP-4x8AK** *4x8 VGA / UXGA / Audio Matrix Switcher* features:

- Kramer's innovative integrated sync processing; Kr-isp® technology that lets you achieve a sharp, stable image when the sync level is too low, by restoring the sync signal waveform
- A video bandwidth of over 360MHz that ensures transparent performance even in the most critical applications
- 12 preset memory locations for quick access to common video and audio configurations and audio gain status for each output
- Automatic detection of the connected input signals (the respective button illuminates)
- A delayed switching mode (ranging from 0 to 3.5sec[1]) for clean transitions when switching between non-genlocked sources
- DC-coupled video inputs and outputs
- Audio-follow-video and breakaway options
- Four stereo unbalanced stereo audio input signals on 3.5mm mini plugs
- Eight balanced stereo audio output signals on 5-pin terminal block connectors
- Audio level control buttons for adjusting the signal level of each input and each output
- Measurement and indication of the audio level for each input and output, in relative dB
- A TAKE button, which allows you to place multiple switches in a queue and then activate them simultaneously with one touch of this button
- A LOCK button to prevent tampering with the front panel
- Supports DDC (Display Data Channel[2]) communication between input 1 and output 1 high-density 15-pin HD connectors on pins 12 and 15
- Control via embedded Web pages

1 In increments of 0.5sec

2 See Section 3.2

Control the **VP-4x8AK** using the front panel buttons, or remotely via:

- RS-485 or RS-232 serial commands (using Kramer 2000 and 3000 protocols) transmitted by a touch screen system, PC, or other serial controller
- The Kramer infrared remote control transmitter or infrared remote extension cable transmitter (optional)
- The ETHERNET

The **VP-4x8AK** is dependable, rugged, and fits into two vertical spaces (2U) of a standard 19" professional rack.

To achieve the best performance:

- Use only good quality connection cables[1] to avoid interference, deterioration in signal quality due to poor matching, and elevated noise levels (often associated with low quality cables).
- Avoid interference from neighboring electrical appliances that may adversely influence signal quality and position your Kramer **VP-4x8AK** away from moisture, excessive sunlight and dust

3.1 Terminology Used in this User Manual

Table 1 defines some terms that are used in this user manual:

Table 1: Terminology Used in this User Manual

Term	Definition
802.3	The standard specification for ETHERNET that is maintained by the Institute of Electrical and Electronics Engineers (IEEE).
Dynamic Host Configuration Protocol (DHCP)	Allows the network administrator to distribute IP addresses from a central point and automatically send a new IP address when an Ethernet point is plugged into a different network location.
Gateway	A network position serving as an entry to another network. On the Internet, a node or stopping point can be either a gateway node or a host (end-point) node.
IP Address	A 32-binary digit number that identifies each sender or receiver (within a network via a particular server or workstation) of data (HTML pages or e-mails) that is sent in packets across the Internet. Every device connected to an IP network must have a unique IP address. This address is used to reference the specific unit.
Local Area Network (LAN)	Computers sharing a common communications line or wireless link, which often share a server within a defined geographic area.
Media Access Control (MAC) Address	A computer's unique hardware number (or address) in a LAN or other network. On an Ethernet LAN, the (MAC) address is identical to the Ethernet address.
Transmission Control Protocol/Internet Protocol (TCP/IP)	The basic communication language or protocol of the Internet that breaks the message into appropriately sized packets for the network, and can be used as a communications protocol in an intranet or an extranet.

1 Available from Kramer Electronics on our Web site at http://www.kramerelectronics.com

3.2 DDC Support

When establishing a VGA connection between a PC or laptop and a display device, a set of parameters known as EDID is exchanged between them, which is carried over the DDC channel. In some PC graphic cards and laptops, this information exchange is essential for proper VGA OUT operation.

3.3 Defining EDID

The Extended Display Identification Data (EDID[1]) is a data-structure, provided by a display, to describe its capabilities to a graphics card (that is connected to the display's source). The EDID enables the PC or laptop to "know" what kind of monitor is connected to the output. The EDID includes the manufacturer's name, the product type, the timing data supported by the display, the display size, luminance data and (for digital displays only) the pixel mapping data.

4 Your VP-4x8AK 4x8 VGA / UXGA / Audio Matrix Switcher

Figure 1, Figure 2, Table 2, and Table 3 define the **VP-4x8AK** *4x8 VGA / UXGA / Audio Matrix Switcher*.

1 Defined by a standard published by the Video Electronics Standards Association (VESA)

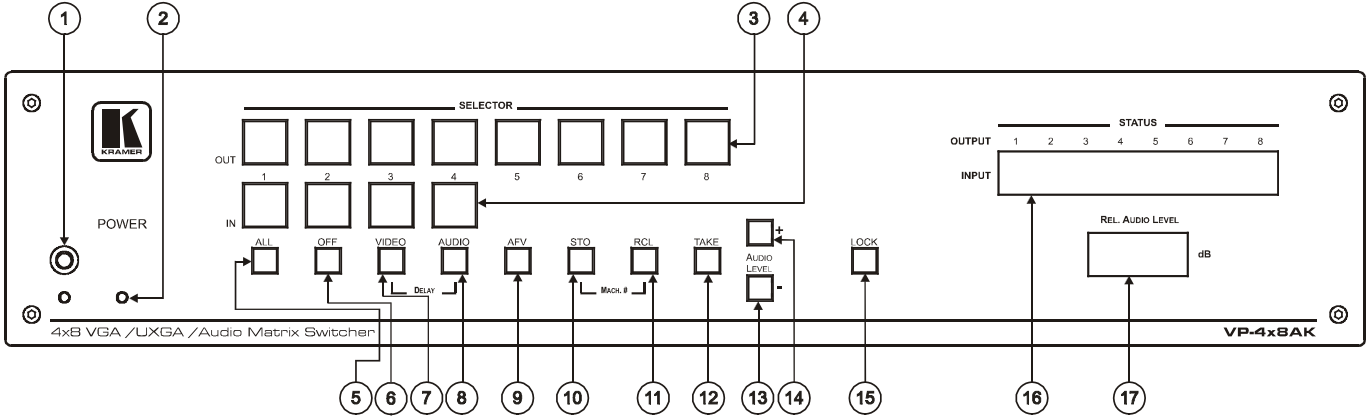


Figure 1: VP-4x8AK 4x8 VGA / UXGA / Audio Matrix Switcher – Front View

Table 2: Front Panel VP-4x8AK 4x8 VGA / UXGA / Audio Matrix Switcher Features

#	Feature		Function
1	IR Receiver		The yellow LED is illuminated when receiving signals from the infrared remote control transmitter
2	*POWER* LED		The green LED is illuminated when the unit is turned ON
3	*SELECTOR OUT* Buttons		Select the output[1] to which the input is switched
4	*SELECTOR IN* Buttons		Select the input (from 1 to 4) to switch to the output (after selecting an output). When a signal is detected at an input connector, the corresponding input button is illuminated
5	*ALL* Button		Pressing ALL followed by an INPUT button, connects that input to all outputs[2]
6	*OFF* Button		Press an OUT SELECTOR button and then an OFF button to disconnect that output from the inputs. Press the ALL button and then the OFF button to disconnect all the outputs
7	*VIDEO* Button		When pressed[3] actions relate to video. Press the VIDEO button together with the AUDIO button to set the Switching delay time (see Section 6.7)
8	*AUDIO* Button		When pressed[4] actions relate to audio. Press the VIDEO button together with the AUDIO button to set the Switching delay time (see Section 6.7)
9	*AFV* Button		When pressed, the audio channels follow the video channels. The button is illuminated when the AFV mode is selected
10	*STO* (Store) Button		Pressing STO followed by an input/output button stores the current setting[5] Press the RCL button together with the STO button to set the machine number (see Section 6.8)
11	*RCL* (*Recall*) Button		Pressing the RCL button and the corresponding IN/OUT button recalls a setup from the non-volatile memory. Press the RCL button again to implement the new status Press the RCL button together with the STO button to set the machine number (see Section 6.8)
12	*TAKE* Button		Pressing TAKE toggles the mode between the Confirm mode[6] and the At Once mode (user confirmation per action is unnecessary). When in Confirm mode, pressing the TAKE button will implement a pending configuration
13	*AUDIO LEVEL*	- Button	Press to decrease the input or output audio signal level
14		+ Button	Press to increase the input or output audio signal level
15	*LOCK* Button		Disengages the front panel switches
16	*STATUS* 7-segment display		Displays the selected INPUT switched to the OUTPUT (marked above each input)[7]
17	*REL. AUDIO LEVEL* 7-segment display		Displays[8] the relative audio level[9]

1 From 1 to 8

2 For example, press ALL and then Input button # 2 to connect input # 2 to all the outputs

3 The VIDEO button is illuminated when in breakaway mode and actions relate to video

4 The AUDIO button is illuminated when in breakaway mode and actions relate to audio

5 For example, press STO and then the output button # 3 to store in Setup # 3, or the input button 4 to store in Setup 12

6 When in the Confirm mode, the TAKE button illuminates

7 Also displays the number of INPUT and OUTPUT ports, the firmware version number, and the MACHINE #. Refer to Section 7.2.1

8 A dot following the number, represents a value of 0.5. For example, 3.5 displays as "3."

9 The input audio level ranges from -100dB to +20dB and the output audio level ranges from -100dB to +7.5dB

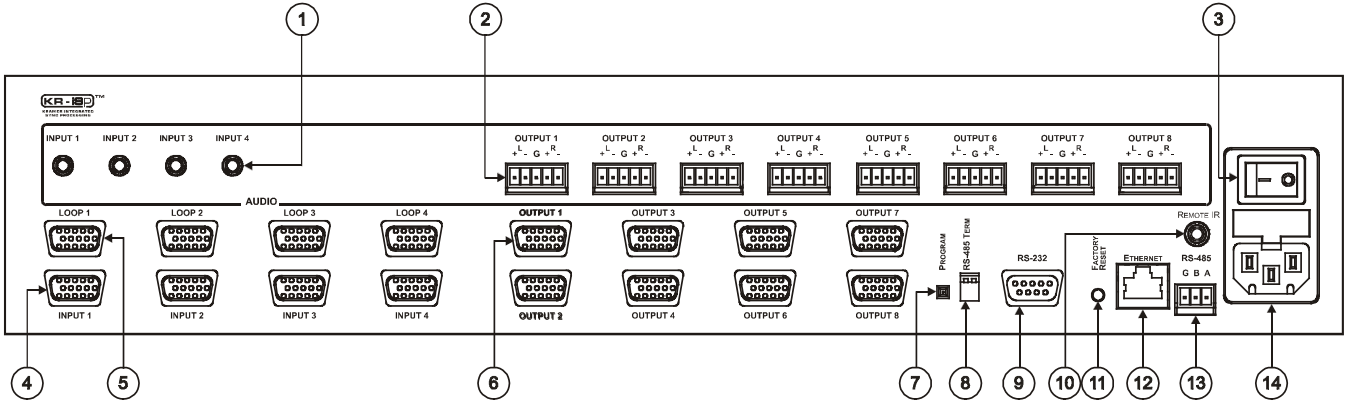


Figure 2: VP-4x8AK 4x8 VGA / UXGA / Audio Matrix Switcher – Rear View

Table 3: Rear Panel VP-4x8AK 4x8 VGA / UXGA / Audio Matrix Switcher Features

#	Feature	Function	
1	*AUDIO INPUT* 3.5mm Mini Connectors	Connect to the unbalanced stereo audio acceptors (from 1 to 4)	
2	*AUDIO OUTPUT* Terminal Block Connectors	Connect to balanced stereo audio sources (from 1 to 8)	
3	Power Switch	Switch for turning the unit ON or OFF	
4	*INPUT* XGA 15-pin HD Connectors	Connect to the video sources (from 1 to 4)	
5	*LOOP* XGA 15-pin HD Connectors	Connect looped input to output acceptor (1 to 4)	
6	*OUTPUT XGA* 15-pin HD Connectors	Connect to the output acceptors (from 1 to 8)	
7	*PROG* Button	Push in for "Program" to upgrade to the latest Kramer firmware via RS-232 (see Section 8), or release for "Normal" (the factory default)	
8	*RS-485 TERM* DIP-switch	Use for RS-485 Termination[1]: ON for RS-485 Line Termination with 120Ω; OFF for no RS-485 Line Termination	
9	*RS-232* 9-pin D-sub Port	Connects to the PC or the remote controller	
10	*REMOTE IR* Opening[2]	Connects to an external IR receiver unit for controlling the machine via an IR remote controller instead of using the front panel IR receiver[3]	
11	*FACTORY RESET* Button	Press to reset to factory default definitions[4]:	
		IP Address:	192.168.1.39
		Mask:	255.255.255.0
		Gateway:	192.168.1.1
12	*ETHERNET* Connector	Connects to the PC or other serial controller through computer networking	
13	*RS-485* Terminal Block Port	Pins B (-) and A (+) are for RS-485; Pin G (Ground) may be connected to the shield of the cable if desired	
14	Power Connector with Fuse	AC connector enabling power supply to the unit	

4.1 Using the IR Transmitter

You can use the **RC-IR3** IR transmitter to control the machine via the built-in IR receiver on the front panel or, instead, via an optional external IR receiver[5]. The external IR receiver can be located up to 15 meters away from the machine. This distance can be extended to up to 60 meters when used with three extension cables[6]

Before using the external IR receiver, be sure to arrange for your Kramer dealer to insert the internal IR connection cable[7] with the 3.5mm connector that fits into the REMOTE IR opening on the rear panel. Connect the external IR receiver to the REMOTE IR 3.5mm connector.

1 The first and the last units on the RS-485 line should be terminated (ON). Other units should be unterminated (OFF)

2 Covered by a cap. The 3.5mm connector at the end of the internal IR connection cable fits through this opening

3 Optional. Can be used instead of the front panel (built-in) IR receiver to remotely control the machine (only if the internal IR connection cable has been installed)

4 Turn the machine OFF using the power switch and then turn it ON while pressing the ETH Factory Reset button. The unit will power up and load its memory with the factory default definitions

5 Model: C-A35M/IRR-50

6 Model: C-A35M/A35F-50

7 P/N: 505-70434010-S

5 Installing the VP-4x8AK in a Rack

This section describes what to do before installing in a rack and how to rack mount.

Before Installing in a Rack

Before installing in a rack, be sure that the environment is within the recommended range:

OPERATING TEMPERATURE:	0º to +55ºC (32º to 131ºF)
STORAGE TEMPERATURE:	-45º to +72ºC (-49º to 162ºF)
HUMIDITY:	10% to 90%, RHL non-condensing

CAUTION!

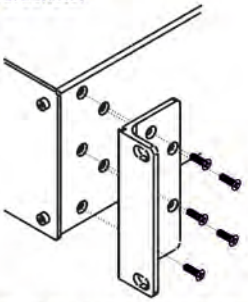
When installing on a 19" rack, avoid hazards by taking care that:

1. It is located within the recommended environmental conditions, as the operating ambient temperature of a closed or multi unit rack assembly may exceed the room ambient temperature.
2. Once rack mounted, enough air will still flow around the machine.
3. The machine is placed straight in the correct horizontal position.
4. You do not overload the circuit(s). When connecting the machine to the supply circuit, overloading the circuits might have a detrimental effect on overcurrent protection and supply wiring. Refer to the appropriate nameplate ratings for information. For example, for fuse replacement, see the value printed on the product label.
5. The machine is earthed (grounded) in a reliable way and is connected only to an electricity socket with grounding. Pay particular attention to situations where electricity is supplied indirectly (when the power cord is not plugged directly into the socket in the wall), for example, when using an extension cable or a power strip, and that you use only the power cord that is supplied with the machine.

How to Rack Mount

To rack-mount a machine:

1. Attach both ear brackets to the machine. To do so, remove the screws from each side of the machine (3 on each side), and replace those screws through the ear brackets.



2. Place the ears of the machine against the rack rails, and insert the proper screws (not provided) through each of the four holes in the rack ears.

Note:

- In some models, the front panel may feature built-in rack ears
- Detachable rack ears can be removed for desktop use
- Always mount the machine in the rack before you attach any cables or connect the machine to the power
- If you are using a Kramer rack adapter kit (for a machine that is not 19"), see the Rack Adapters user manual for installation instructions available from: http://www.kramerelectronics.com)

6 Using the VP-4x8AK

This section describes how to:

- Connect the **VP-4x8AK** rear panel (see Section 6.1)
- Connect a balanced stereo audio output (see Section 6.2)
- Connect the **VP-4x8AK** to a controlling device via RS-232 (see Section 6.3), RS-485 (see Section 6.4) and/or the ETHERNET (see Section 6.5)
- Set the switching delay time (see Section 6.7)
- Set the machine number (see Section 6.8)
- Connect several **VP-4x8AK** machines (see Section 6.9)

6.1 Connecting the VP-4x8AK Rear Panel

To connect[1] the **VP-4x8AK**, as illustrated in the example in Figure 3, do the following[2]:

1. Connect up to four VGA/UXGA computer graphics sources to the INPUT 15-pin HD connectors.
2. Connect up to four unbalanced stereo audio sources (for example, the audio source of the computer, or a stereo audio source) to the four INPUT 3.5mm mini connectors.
3. Connect up to four VGA/UXGA output acceptors to the LOOP connectors (local displays or inputs to other cascaded units).
4. Connect the eight OUTPUT 15-pin HD connectors to up to eight VGA/UXGA video acceptors (for example, displays).
5. Connect the eight OUTPUT terminal block connectors to up to eight balanced stereo audio acceptors (for example, balanced stereo audio amplifiers with speakers).
6. If required, you can connect a PC and/or controller to the:
   - RS-232 port (see Section 6.3)
   - RS-485 port (see Section 6.4)
   - ETHERNET (see Section 6.5)
7. Connect the power cord[3] (not shown in Figure 3).

1 You do not need to connect all inputs and outputs

2 Switch OFF the power on each device before connecting it to your VP-4x8AK. After connecting your VP-4x8AK, switch on its power and then switch on the power on each device. DO NOT push in the rear panel Flash Program “PROG” button , it is only used for upgrading to the latest Kramer firmware (see Section 8)

3 We recommend that you use only the power cord that is supplied with this machine

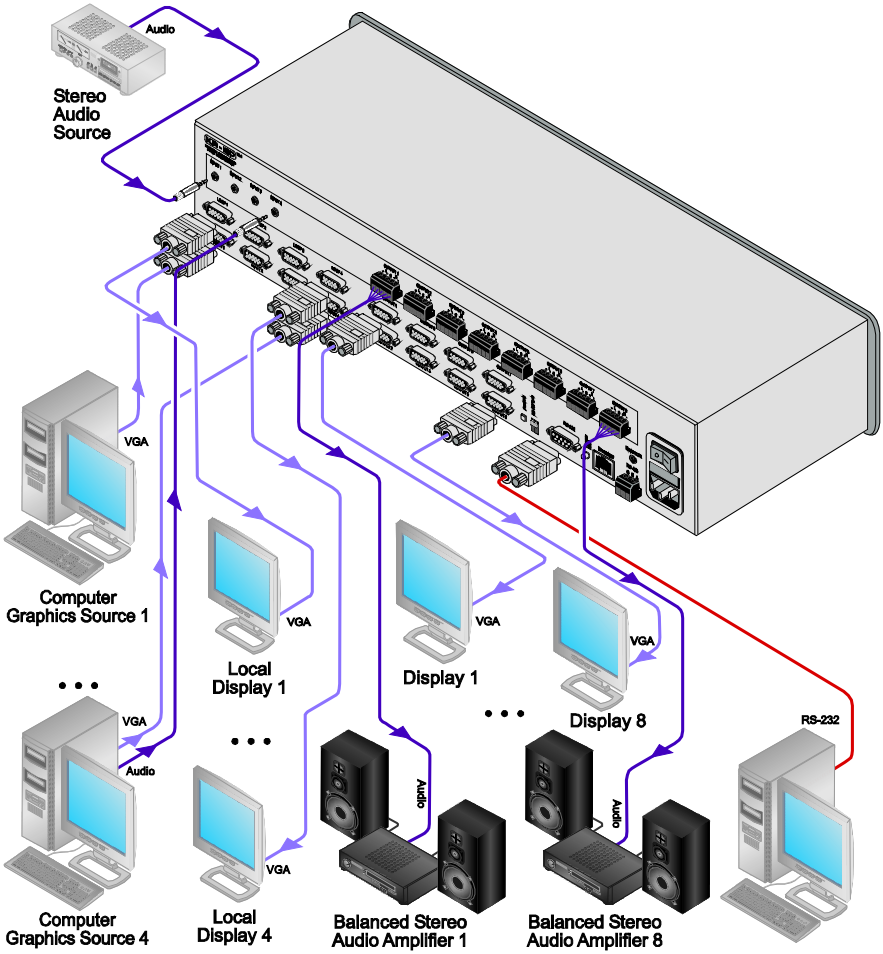


Figure 3: Connecting the VP-4x8AK 4x8 VGA / UXGA / Audio Matrix Switcher

6.2 Connecting the Balanced/Unbalanced Stereo Audio Output

This section illustrates how to wire:

- A balanced output connection, see Figure 4
- An unbalanced audio output, see Figure 5

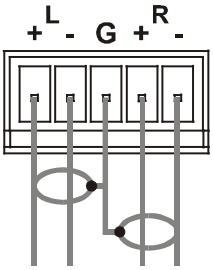


Figure 4: Connecting the Balanced Stereo Audio Output

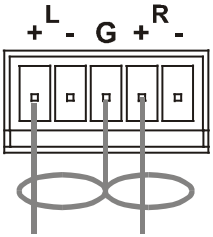


Figure 5: Connecting an Unbalanced Output

6.3 Connecting a PC or Controller to the RS-232 Port

You can connect to the **VP-4x8AK** via an RS-232 connection using, for example, a PC. Note that a null-modem adapter/connection is not required.

To connect to the **VP-4x8AK** via RS-232:

- Connect the RS-232 9-pin D-sub rear panel port on the product unit via a 9-wire straight cable (only pin 2 to pin 2, pin 3 to pin 3, and pin 5 to pin 5 need to be connected) to the RS-232 9-pin D-sub port on your PC

6.4 Connecting a PC or Controller to the RS 485 Port

You can operate the **VP-4x8AK** via the RS-485 port from a distance of up to 1200m (3900ft) using any device equipped with an RS-485 port (for example, a PC). For successful communication, you must set the RS-485 machine number and bus termination.

To connect a device with a RS-485 port to the **VP-4x8AK**:

- Connect the A (+) pin on the RS-485 port of the PC to the A (+) pin on the RS-485 port on the rear panel of the **VP-4x8AK**
- Connect the B (–) pin on the RS-485 port of the PC to the B (–) pin on the RS-485 port on the rear panel of the **VP-4x8AK**
- Connect the G pin on the RS-485 port of the PC to the G pin on the RS-485 port on the rear panel of the **VP-4x8AK**

6.5 Configuring the Ethernet Port

To configure the Ethernet port, you have to connect your PC to the **VP-4x8AK** either via the Ethernet (see Section 6.5.1) or via a serial port. Once the machine is connected, you can configure the Ethernet port.

6.5.1 Connecting via the Ethernet

You can connect the **VP-4x8AK** via the ETHERNET in the following ways:

- For direct connection to the PC, use a crossover cable (see Section 6.5.1.1)
- For connection via a network hub or network router, use a straight-through cable (see Section 6.5.1.2)

6.5.1.1 Connecting the ETHERNET Port Directly to a PC (Crossover Cable)

You can connect the Ethernet port of the machine to the Ethernet port on your PC, via a crossover cable with RJ-45 connectors.

This type of connection is recommended for identification of the factory default IP Address[1] of the **VP-4x8AK** during the initial configuration

After connecting the Ethernet port, configure your PC as follows:

1. Right-click the My Network Places icon on your desktop.
2. Select **Properties**.
3. Right-click Local Area Connection Properties.

1 The default IP address is 192.168.1.39

4. Select **Properties**.
   The Local Area Connection Properties window appears.
5. Select the Internet Protocol (TCP/IP) and click the **Properties** Button (see Figure 6).

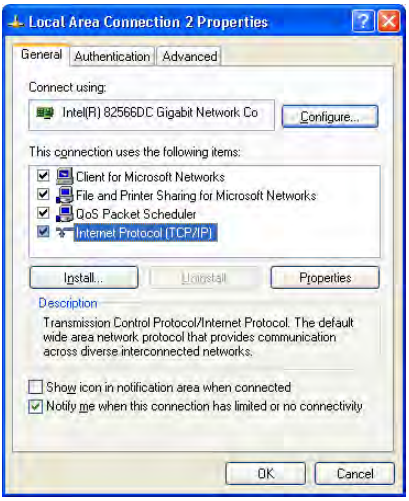


Figure 6: Local Area Connection Properties Window

6. Select Use the following IP Address, and fill in the details as shown in Figure 7.
7. Click **OK**.

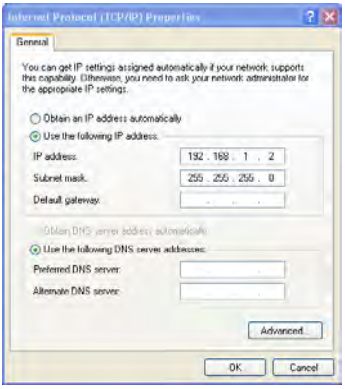

Internet Protocol (TCP/IP) Properties
General
You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings.
Obtain an IP address automatically
Use the following IP address:
IP address:
192 . 168 . 1 . 2
Subnet mask:
255 . 255 . 255 . 0
Default gateway:
Obtain DNS server address automatically
Use the following DNS server addresses:
Preferred DNS server:
Alternate DNS server:
Advanced...
OK
Cancel

Figure 7: Internet Protocol (TCP/IP) Properties Window

6.5.1.2 Connecting the ETHERNET Port via a Network Hub (Straight-Through Cable)

You can connect the Ethernet port of the **VP-4x8AK** to the Ethernet port on a network hub or network router, via a straight-through cable with RJ-45 connectors.

6.5.2 Ethernet Port Configuration

To configure the Ethernet port, download the *Device Properties* Ethernet configuration software. Extract the file to a folder and create a shortcut on your desktop to the file.

Follow these steps to configure the port:

1. Double click the desktop icon.
   The Connect screen appears as follows:

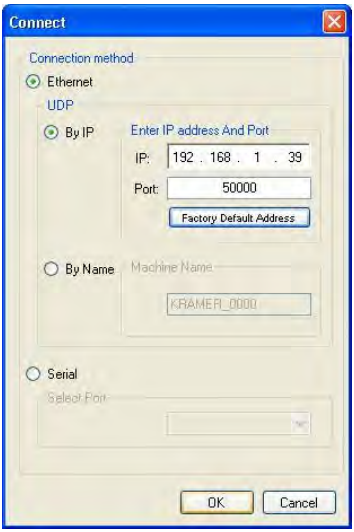


Figure 8: Connect Screen

2. Select the method to connect to the Ethernet port of the **VP-4x8AK**.
   Select:
   - Ethernet, if you know the IP address number[1] or the machine name. The default name for the machine is KRAMER_XXXX[2]
   - Serial, if you are connected via a serial port

1 The default IP address is 192.168.1.39

2 The four digits are the last four digits of the machine's serial number.

3. Click OK.
   The Device Properties window appears:

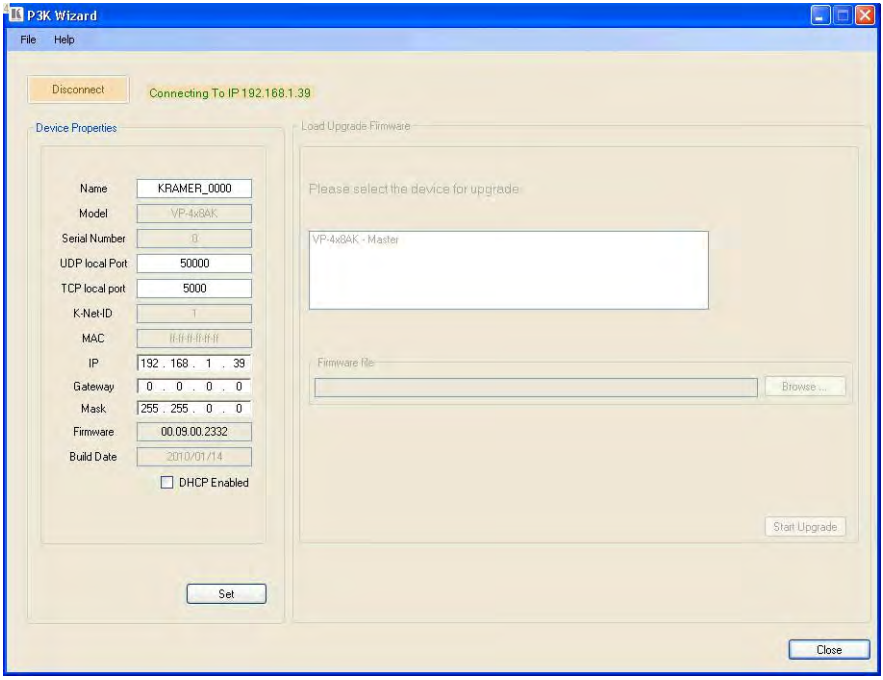


Figure 9: Device Properties Screen

4. If required, make changes and press Set. If not, click Close.

6.6 Control via the Ethernet Port

You can control the **VP-4x8AK** via RS-232/RS-485 or the Ethernet using the Kramer K-Router application.

If you are controlling a standalone unit via RS-232 or the Ethernet, configure the unit as master (Mach No. 1), see Section 6.8.

6.7 Setting the Switching Delay Time

You can achieve clean transitions when switching between non-genlocked sources by setting the delay time—ranging from 0sec to 3.5sec[1]. The factory default delay is to 0sec.

To set the delay time, do the following:

1. Press the VIDEO and AUDIO front panel buttons simultaneously.
   The 7-segment display shows the current switching delay time.
2. Use the + and – front panel buttons to set the delay time as required.

To exit the Delay mode, press the TAKE front panel button.

6.8 Setting the Machine Number

The MACH. # (machine number) determines the position of a **VP-4x8AK** unit when cascading units.

To set the MACH. #, do the following:

1. Press the STO and RCL front panel buttons simultaneously.
   The 7-segment display shows the current machine number.
2. Use the + and – front panel buttons to set the machine number as required.

To exit the MACH. # mode, press the TAKE front panel button.

6.9 Cascading Machines

You can cascade up to 16 **VP-4x8AK** units with control from a PC or serial controller.

To cascade up to 16 individual **VP-4x8AK** units via RS-485 (as illustrated in Figure 10), do the following:

1. Connect the sources and acceptors, as Section 6.1 describes.
2. Connect the RS-232 port[2] of the first **VP-4x8AK** unit to a PC.
3. Connect the RS-485 terminal block port on the first unit to the RS-485 port on the second **VP-4x8AK** unit and so on, connecting all the RS-485 ports.
4. Set the machine numbers of the connected machines, as described in Section 6.8, by set the first **VP-4x8AK** unit as Machine # 1 and the following 15 **VP-4x8AK** units as Machine # 2 to Machine # 16.

1 In increments of 0.5sec

2 Alternatively, the ETHERNET port could be used for PC control (instead of RS-232)

5. Set the RS-485 TERM DIP-switch ON on the first and last **VP-4x8AK** units (terminating the RS-485 line at 120Ω). Set the RS-485 TERM DIP-switch OFF on the other **VP-4x8AK** units.

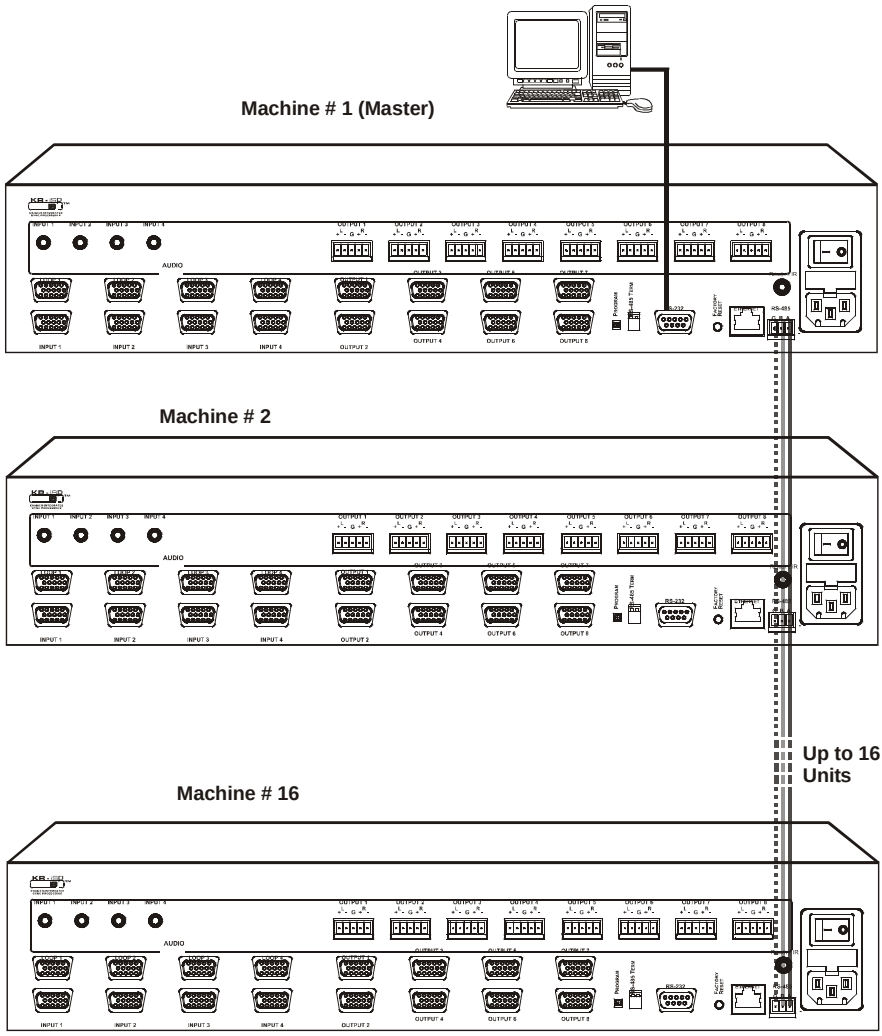


Figure 10: Control Configuration via RS-232 and RS-485

7 Operating the VP-4x8AK

This section describes how to:

- Use the IN and OUT buttons (see Section 7.1)
- Read the 7-segment displays (see Section 7.2)
- Confirm settings (see Section 7.3)
- Store and recall input/output configurations (see Section 7.4)
- Lock the front panel (see Section 7.5)
- Choose the audio-follow-video or the breakaway feature (see Section 7.6)
- Use the audio gain control (see Section 7.7)

7.1 Switching an Input to an Output

To switch an input to an output:

1. Press the required OUT button.
   The input under the selected output on the IN 7-segment display blinks.
2. Press an IN button to select the input to switch to the output.
   The selected input number appears on the 7-segment display.

Incomplete operations on the **VP-4x8AK** timeout after 15 seconds

7.2 Understanding the 7-Segment Displays

The **VP-4x8AK** has two displays:

- The STATUS 7-segment display
- The REL. AUDIO LEVEL (dB) 7-segment display

7.2.1 The STATUS 7-Segment Display

During normal operation, the STATUS display shows which inputs are switched to which outputs, as illustrated in Figure 11. In the VIDEO mode, the display shows the video signal setup and in the AUDIO mode, it shows the audio signal setup. In the AFV it shows both signals (see Section 7.6).

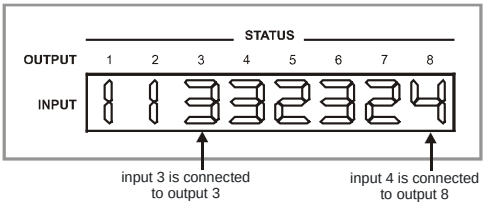


Figure 11: 7-segment display During Normal Operation

Figure 12 shows an example of the display immediately after switching on the power. This display disappears after a few seconds, replaced by the normal display.

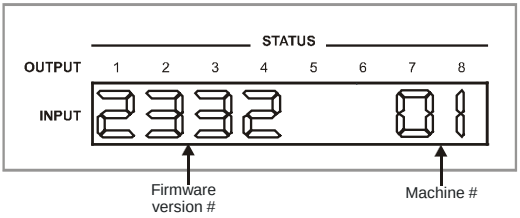


Figure 12: 7-segment Display after Turning the Switcher ON

7.2.2 The REL AUDIO LEVEL 7-Segment Display

The REL AUDIO LEVEL display, as illustrated in Figure 13, is active only in the AUDIO and AFV modes (see Section 7.7).

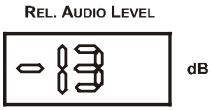


Figure 13: REL AUDIO LEVEL 7-segment Display

7.3 Confirming Settings

You can choose to work in the At Once or the Confirm mode.

In the At Once mode (TAKE button does not illuminate):

- Pressing an OUT-IN combination implements the switch immediately
- You save time as execution is immediate and actions require no user confirmation
- No protection is offered to allow the correction of an erroneous action before it is implemented

In the Confirm mode (TAKE button illuminates):

- You can key-in several actions and then confirm them by pressing the TAKE button, to simultaneously activate the multiple switches
- Every action requires user confirmation, protecting against erroneous switching
- Execution is delayed[1] until the user confirms the action

1 Failure to press the TAKE button within 40 seconds (the Timeout) will abort the action

7.3.1 Toggling between the At Once and Confirm Modes

To toggle between the At Once and Confirm modes, do the following:

1. Press the TAKE button to toggle from the At Once mode (in which the TAKE button does not illuminate) to the Confirm mode (in which the TAKE button illuminates).
   Actions now require user confirmation and the TAKE button illuminates.
2. Press the illuminated TAKE button to toggle from the Confirm mode back to the At Once mode.
   Actions no longer require user confirmation and the TAKE button no longer illuminates.

7.3.2 Confirming a Switching Action

To confirm a switching action (in the Confirm mode), do the following:

1. Press an OUT-IN combination.
   The corresponding 7-segment display blinks with the new value. The TAKE button also blinks.
2. Press the blinking TAKE button to confirm the action.
   The corresponding 7-segment display no longer blinks. The TAKE button illuminates.

To confirm several actions (in the Confirm mode), do the following:

1. Press each OUT-IN combination in sequence.
   The corresponding 7-segment display blinks. The TAKE button also blinks.
2. Press the blinking TAKE button to confirm all the actions.
   The corresponding 7-segment display no longer blinks. The TAKE button illuminates.

7.4 Storing/Recalling Input/Output Configurations

You can store and recall up to 12 input/output configuration setups[1] using the eight OUT buttons and the four IN buttons, as Figure 14 illustrates:

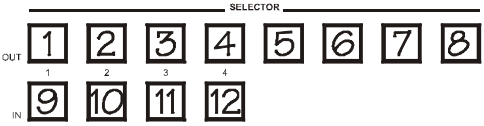


Figure 14: Storing and Recalling using the Input/Output Buttons

1 You can store and recall audio and video configurations and audio gain data

7.4.1 Storing an Input/Output Configuration

To store the current status in memory, do the following:

1. Press the STO button.
   The STO button blinks.
2. Press one of the 12 IN/OUT buttons (this will be the setup # in which the current status is stored). If in the Confirm mode, press the blinking TAKE button to confirm the action.
   The memory stores the data at that reference.

7.4.2 Recalling an Input/Output Configuration

To recall an input/output configuration, do the following:

1. Press the RCL button.
   The RCL button blinks.
2. Press the appropriate IN/OUT button (the button # corresponding to the setup #). If in the Confirm mode, that setup configuration will blink in the 7-segment display, together with the RCL button and the TAKE button, and will only be implemented after pressing the TAKE button.
   The memory recalls the stored data from that reference.

Tip: If you cannot remember which of the 12-input/output configurations is the one that you want, set the **VP-4x8AK** to the Confirm mode and manually scan[1] all the input/output configurations until you locate it.

7.5 Locking the Front Panel

To prevent changing the settings accidentally or tampering with the unit via the front panel buttons, lock[2] your **VP-4x8AK**. Unlocking releases the protection mechanism.

To lock the **VP-4x8AK**:

- Press the LOCK button for more than two seconds, until the LOCK button is illuminated.
  The front panel is locked. Pressing a button will have no effect other than causing the LOCK button to blink[3]

To unlock the **VP-4x8AK**:

- Press the illuminated LOCK button, for more than two seconds, until the LOCK button is no longer illuminated and the front panel unlocks

1 By pressing the RCL button followed by the INPUT/OUTPUT buttons

2 Even when the front panel is locked you can still operate via RS-232 or RS-485, as well as via the infrared remote control transmitter

3 Warning that you need to unlock to regain control via the front panel

7.6 Choosing the Audio-Follow-Video or Breakaway Option

You can switch stereo audio signals in one of two ways, either:

- Audio-follow-video (AFV), in which all operations relate to both the video and the audio channels; or
- Breakaway, in which video and audio channels switch independently

7.6.1 Setting the Audio-Follow-Video Option

To set the Audio-follow-video (AFV) option, press the AFV button:

- If the AUDIO and VIDEO configurations are the same, then the AFV button illuminates. The audio follows the video.
- If the AUDIO differs from the VIDEO, then the TAKE and the AUDIO buttons flash. Also, the audio outputs, which are changed, flash[1] in the INPUT STATUS 7-segment display. Press the TAKE button to confirm the modification. The audio follows the video.

7.6.2 Setting the Breakaway Option

To set the Breakaway option:

Press either the AUDIO (for audio control only) or the VIDEO (for video control only) button:

- If the AUDIO button illuminates, switching operations relate to Audio, and the 7-segment display shows the audio status
- If the VIDEO button illuminates, switching operations relate to Video, and the 7-segment display shows the video status

7.7 The Audio Input/Output Gain Control

The audio output[2] signal gain is activated when the machine is in the AUDIO or AFV mode.

To increase or decrease the audio gain:

1. Select the output whose audio gain you want to change.
   For example, press OUT 4.
   The OUT 4 button blinks and so does the respective input on the display.
2. Press the + or – button to increase or decrease, respectively, the audio gain of the selected output.
   The audio gain display lights and the audio level value shows on the display.

1 Warning that you are about to modify the audio configuration for AFV operation

2 In this section, the output also refers to the input

The **VP4x8AK** output audio signal level[1] is shown on the REL. AUDIO LEVEL 7-segment display.

The factory default audio gain is set to 0dB. An audio gain value of 0dB indicates that the output signal value is identical to the input signal value. When increasing/decreasing the audio gain, the output signal level is higher/lower than the input signal level.

Gain level values are relative since the audio input signal can be also adjusted, while the range of the output gain remains constant[1], independent of the input level adjustment.

8 Flash Memory Upgrade

The **VP4x8AK** uses a microcontroller that runs firmware located in FLASH memory.

The latest version of firmware and installation instructions can be downloaded from the Kramer Web site at www.kramerelectronics.com.

1 The input level ranges from -100 to +20 and the output level ranges from -100 to +7.5

9 Controlling via the Embedded Web Pages

You can remotely operate the **VP-4x8AK** using a Web browser via the Ethernet connection (see Section 9.1). To be able to do so, you must use a supported Web browser; Microsoft (V6.0 and higher), Chrome, or Firefox (V3.0 and higher).

To check that Java is installed correctly and running, browse to: http://www.java.com/en/download/help/testvm.xml

This page runs a test and displays a Java success (see Figure 15) or failure message.

Figure 15: Java Test Page Success Message

If you do not see the success message, follow the instructions on the page to:

- Load and enable Java
- Enable Javascript in your browser

9.1 Connecting to the VP-4x8AK via your Browser

Make sure that your PC is connected via a network to the **VP-4x8AK** and do the following:

1. Open your Internet browser.
2. Enter the unit's IP number[1] or name in the Address bar of your browser. If you are using DHCP, you have to enter the name.

Figure 16: Entering the IP Number in the Address Bar

1 The default IP number is 192.168.1.39, and may be changed by the system integrator

The following window appears:

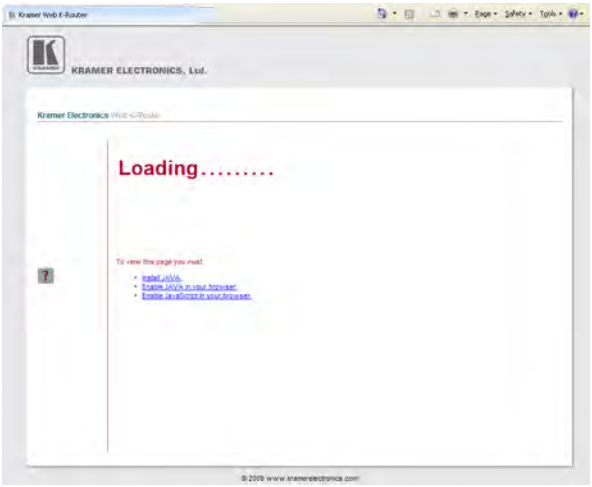


Figure 17: Loading the Embedded Web Pages

Check that Java and JavaScript is enabled in your browser. The following window appears:

Warning - Security
The application's digital signature cannot be verified.
Do you want to run the application?
Name: K_Applet
Publisher: Kramer Electronics
From: http://192.168.1.39
Always trust content from this publisher.
Run
Cancel
The digital signature cannot be verified by a trusted source. Only run if you trust the origin of the application.
More Information...

Figure 18: First Time Security Warning

3. Click Run.
   The **VP-4x8AK** switching control page is displayed (see Figure 19).

The Web embedded screens let you control the **VP-4x8AK** via the Ethernet. The menu appears on the left side of the screen. There are three remote operation Web pages:

- The switching matrix (see Section 9.2)
- Audio gain control (See Section 9.3)
- Configuration (See Section 9.4)

A help box is available for each screen when clicking the question mark that appears on the left side of the screen.

9.2 The VP-4x8AK Switching Matrix Page

The **VP-4x8AK** switching matrix page lets you route any or all of the four inputs to any or all of the eight outputs, by clicking the audio and/or video signal indicators (purple and blue, respectively):

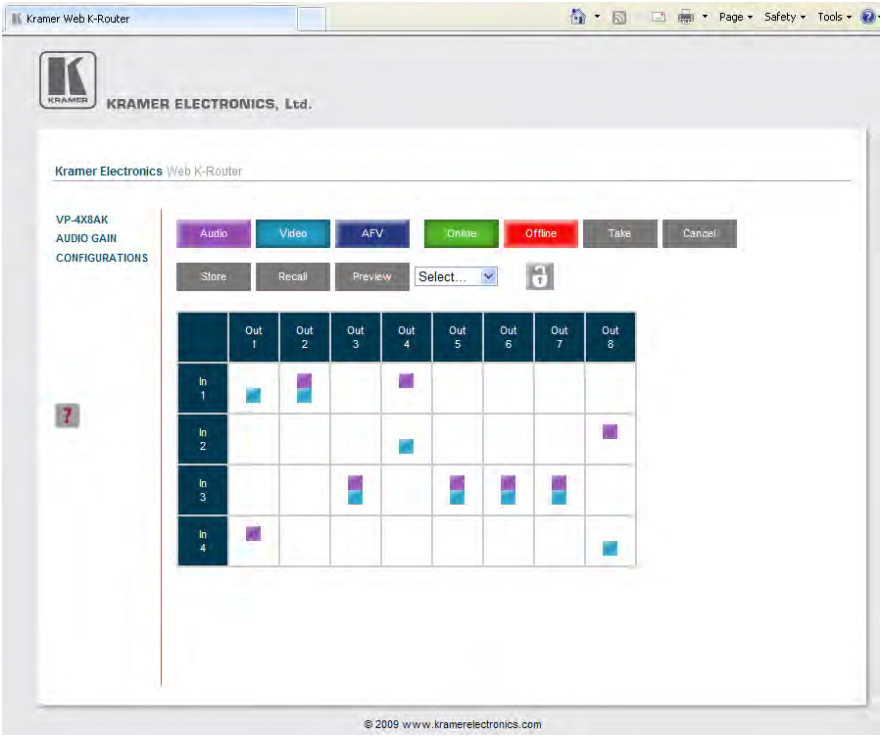


Figure 19: VP-4x8AK Embedded Web Page

You can perform the following operations via this Web page:

- Operate in the AFV mode or switch the audio and video separately, by clicking the Audio, Video or AFV buttons (see Section 9.2.1)
- Deselect an audio and/or video signal[1] by clicking that signal indicator
- Operate in the At Once or Confirm mode (see Section 9.2.2)
- Lock or unlock the front panel, by clicking the lock icon
- Store and recall switching configurations (see Section 9.2.3)

9.2.1 Switch an Input to an Output via the Embedded Web Pages

To switch an input to an output (for example, input 1 to output 4):

1. Set the button to the desired operation mode (Audio, Video or AFV, as required).
2. Click the switching-point within the switching matrix (In 1 to Out 4).
   The audio/video signal indicators move to the In 1 to Out 4 switching matrix box, indicating that In 1 is now switched to Out 4.

Figure 20: Switching an Input to an Output

9.2.2 Operate in the Confirm Mode

By default, the device is set to the At-Once mode. To operate in the Confirm mode:

1. Click the red Offline button.
2. Click the desired switching-point in the switching matrix.
   Audio/video indicator outlines appear and the Take and Cancel buttons turn blue.

1 Depending on the operation mode (Audio, Video or AFV)

Figure 21: Switching an Input to an Output

3. Click either Take (to accept change) or Cancel.

You can repeat steps 2 and 3 several times.
To confirm several actions, select several switching points and then press TAKE

4. Click the Online button to exit the Confirm mode.

If you click the Online button before you click the TAKE button, the following warning appears:

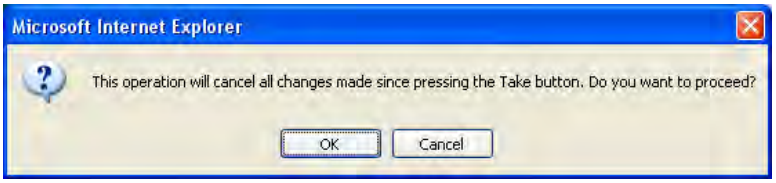

Microsoft Internet Explorer
This operation will cancel all changes made since pressing the Take button. Do you want to proceed?
OK
Cancel

Figure 22: Exiting Offline Warning

9.2.3 Store and Recall Setups

To store a matrix configuration:

1. From the Preset drop-down list, select a preset (for example, Preset 07).
   Presets that contain a configuration are displayed with a blue background; presets with no configuration have a white background.
   When selecting a preset, the Store button changes from gray to dark blue.

Figure 23: Selecting a Preset

2. Click the Preview button to view the current setup stored in Preset 7.
3. Make sure the matrix is set to the desired configuration. If not, set it as required.
4. Click Store.
   The following window appears:

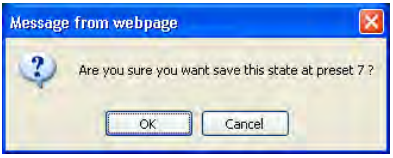


Figure 24: Save Preset Message

5. Click OK.
   The new In/Out configuration is stored in Preset 07.

To recall a preset configuration:

1. Select the desired preset number from the Preset drop-down list[1] (for example, Preset 03):
2. Click and hold the Preview button to view the selected Preset and then release.
3. Click Recall.
   The following window appears:

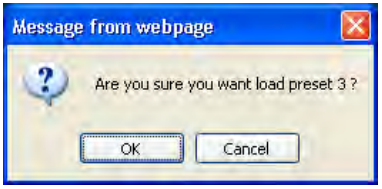


Figure 25: Load Preset Message

1 When selecting a preset that contains a configuration, the Recall button changes from gray to dark blue

4. Click OK.
   The new In/Out configuration takes effect.

You can recall a preset configuration in the Confirm mode by repeating the above procedure in the Offline state. The recalled configuration will become active when you press the Take button.

Figure 26: Recalling a Preset in the Confirm Mode

The Help Box ?

This is the main panel window. In this window you can control the channels.

9.3 Audio Gain Page

The AUDIO GAIN screen lets you set the gain for each of the input and output channels:

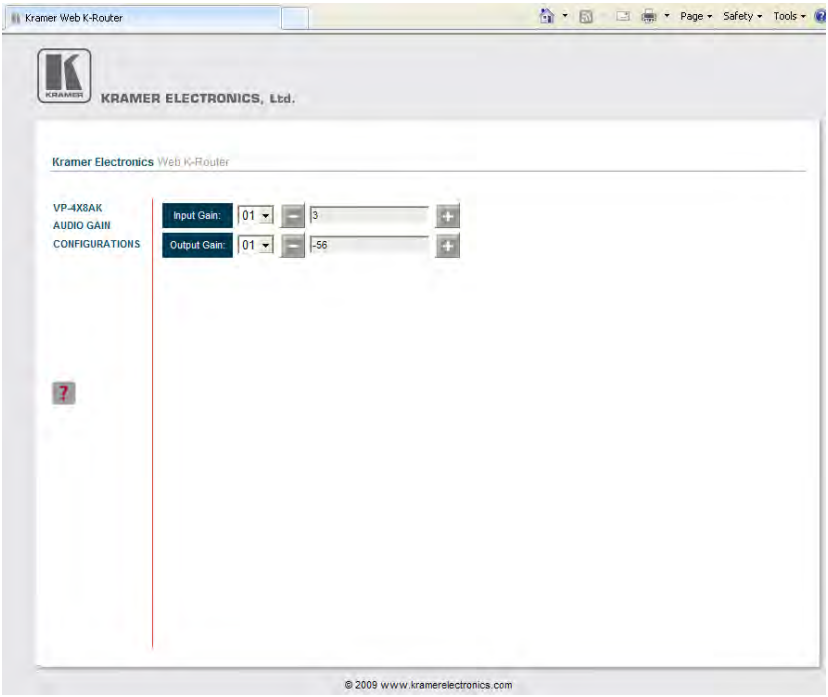


Figure 27: Audio Gain Page

To change an input or output gain, select the channel number, then click and hold the + or – buttons to increase or decrease the gain, respectively.

A single click will increase/decrease the audio gain by 0.5 units; double click to increase/decrease the gain by 1 unit.

The Help Box ?
In this page you can control the audio gain of the channels.

9.4 The Configurations Page

The CONFIGURATIONS page lets you view some Ethernet settings[1] and change others (see Figure 28).

To change CONFIGURATION definitions:

1. Click CONFIGURATIONS. The CONFIGURATIONS Web page appears.
2. Change the definitions as required.
3. Click the Submit button to apply changes[2]. A window appears asking if you are sure you want to change the network settings.
4. Click Yes.
   A window appears announcing that the configuration has been successfully changed.
5. Click OK
6. If the IP number had been changed, close the browser and reload the Web page.

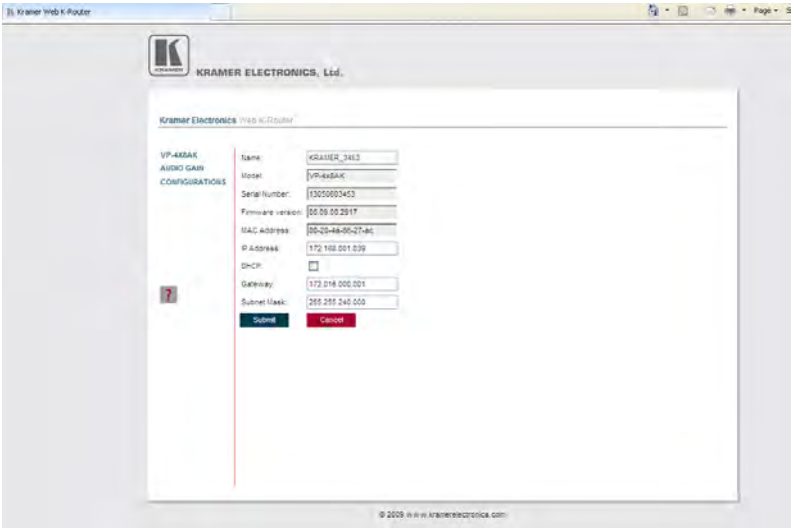


Figure 28: CONFIGURATIONS Embedded Web Page

HELP BOX ?

This page lets you view and set the device configuration.

1 The model name, serial number, firmware version and MAC address

2 Or Cancel to cancel changes

10 Technical Specifications

Table 4 lists the technical specifications:

Table 4: Technical Specifications[1] of the VP-4x8AK 4x8 Video Audio Matrix Switcher

INPUTS:	4 XGA on 15-pin HD connectors (VGA through UXGA); 4 unbalanced stereo audio 3.5mm mini connectors	
OUTPUTS:	8 VGA on 15-pin HD connectors (VGA through UXGA); 4 LOOP XGA on 15-pin HD connectors (VGA through UXGA) 8 balanced stereo audio terminal block connectors	
MAX. OUTPUT LEVEL:	VIDEO: 2.3Vpp	AUDIO: 3.2dBu
BANDWIDTH (-3dB):	VIDEO: 360MHz	AUDIO: 22kHz
DIFF. GAIN:	0.05%	
DIFF. PHASE:	0.05%	
K-FACTOR:	<0.05%	
S/N RATIO:	VIDEO: 66dB @5MHz	AUDIO: 82dB
CROSSTALK (all hostile):	VIDEO: -52dB, 5MHz	AUDIO: Bal: <-70dB @20kHz
CONTROLS:	Input/output selector buttons, all, off, video, audio, AFV, store, recall, take audio level, and lock buttons. RS-232, RS-485, and Ethernet control. Input and output level control, infrared	
COUPLING:	VIDEO: DC	AUDIO: AC
AUDIO THD + NOISE:	0.24%	
AUDIO 2nd HARMONIC:	0.002%	
POWER SOURCE:	100-240V AC, 19VA	
DIMENSIONS:	19" x 7" x 2U W, D, H	
WEIGHT:	3.8kg (8.4lbs) approx	
ACCESSORIES:	Power cord, rack “ears”, Windows®-based control software, external remote IR receiver cable[2]	

1 Specifications are subject to change without notice

2 P/N: C-A35M/IRR-50

11 Communication Parameters

Table 5 lists the communication parameters as used in Kramer Electronics products.

Table 5: Communication Parameters

EDID			
EDID data is passed between Output 1 and Input 1			
RS-232			
Protocol 2000		**Protocol 3000 (Default)**	
Baud Rate:	9600	Baud Rate:	115,200
Data Bits:	8	Data Bits:	8
Stop Bits:	1	Stop Bits:	1
Parity:	None	Parity:	None
Command Format:	HEX	Command Format:	ASCII
Example (Output 1 to Input 1):	0x01, 0x81, 0x81, 0x81	Example (Output 1 to Input 1):	#AV 1>1<CR>
Switching Protocol			
P2000 -> P3000		**P3000 -> P2000**	
Command:	0x38, 0x80, 0x83, 0x81	Command:	#P2000<CR>
Front Panel:	Press and hold Output 1 and Output 3 simultaneously	Front Panel:	Press and hold Output 1 and Output 2 simultaneously
Ethernet			
Default Settings	**Reset Settings**		
IP Address: 192.168.1.39	Power cycle the unit while holding in the Factory Reset button, located on the rear panel of the unit.		
TCP Port #: 5000			
UDP Port #: 50000			

12 Table of ASCII Codes for Serial Communication (Protocol 3000)

Table 6 and Table 7 list the ASCII values to switch an input to an output for a single **VP-4x8AK** machine. For more detailed information, see Protocol 3000 (Section 14.2).

Table 6: VP-4x8AK Video Signal Codes for Protocol 3000

	OUT 1	**OUT 2**	**OUT 3**	**OUT 4**	**OUT 5**	**OUT 6**	**OUT 7**	**OUT 8**
IN 1	#V 1>1 CR	#V 1>2 CR	#V 1>3 CR	#V 1>4 CR	#V 1>5 CR	#V 1>6 CR	#V 1>7 CR	#V 1>8 CR
IN 2	#V 2>1 CR	#V 2>2 CR	#V 2>3 CR	#V 2>4 CR	#V 2>5 CR	#V 2>6 CR	#V 2>7 CR	#V 2>8 CR
IN 3	#V 3>1 CR	#V 3>2 CR	#V 3>3 CR	#V 3>4 CR	#V 3>5 CR	#V 3>6 CR	#V 3>7 CR	#V 3>8 CR
IN 4	#V 4>1 CR	#V 4>2 CR	#V 4>3 CR	#V 4>4 CR	#V 4>5 CR	#V 4>6 CR	#V 4>7 CR	#V 4>8 CR

Table 7: VP-4x8AK Audio Signal Codes for Protocol 3000

	OUT 1	OUT 2	OUT 3	OUT 4	OUT 5	OUT 6	OUT 7	OUT 8
IN 1	#A 1>1 CR	#A 1>2 CR	#A 1>3 CR	#A 1>4 CR	#A 1>5 CR	#A 1>6 CR	#A 1>7 CR	#A 1>8 CR
IN 2	#A 2>1 CR	#A 2>2 CR	#A 2>3 CR	#A 2>4 CR	#A 2>5 CR	#A 2>6 CR	#A 2>7 CR	#A 2>8 CR
IN 3	#A 3>1 CR	#A 3>2 CR	#A 3>3 CR	#A 3>4 CR	#A 3>5 CR	#A 3>6 CR	#A 3>7 CR	#A 3>8 CR
IN 4	#A 4>1 CR	#A 4>2 CR	#A 4>3 CR	#A 4>4 CR	#A 4>5 CR	#A 4>6 CR	#A 4>7 CR	#A 4>8 CR

Table 8 lists the codes that set the audio input gain. For more detailed information, see Section 14.2.

Table 8: VP-4x8AK Audio Input Gain Codes

INPUT 1		INPUT 5		INPUT X*	Level [Rel]
#AUD-LVL 1,1, -100CR	...	#AUD-LVL 1,5, -100CR	...	#AUD-LVL 1,X, -100CR	-100dB Mute
⋮		⋮		⋮	
#AUD-LVL 1,1, -50CR	...	#AUD-LVL 1,5, -50CR	...	#AUD-LVL 1,X, -50CR	-50dB
⋮		⋮		⋮	
#AUD-LVL 1,1, 0CR	...	#AUD-LVL 1,5, 0CR	...	#AUD-LVL 1,X, 0CR	0dB
⋮		⋮		⋮	
#AUD-LVL 1,1, 20CR	...	#AUD-LVL 1,5, 20CR	...	#AUD-LVL 1,X, 20CR	+20dB (Max)

* Where X is the input number from 1 - 8. For example, for channel 7 and relative level -50dB, **#AUD-LVL 1,7, -50CR**

Table 9 lists the codes that set the audio output gain. For more detailed information, see Section 14.2.

Table 9: VP-4x8AK Audio Output Gain Codes

OUTPUT 1		OUTPUT 5		OUTPUT X*	Level [Rel]
#AUD-LVL 2,1, -100CR	...	#AUD-LVL 2,5, -100CR	...	#AUD-LVL 2,X, -100CR	-100dB Mute
⋮		⋮		⋮	
#AUD-LVL 2,1, -50CR	...	#AUD-LVL 2,5, -50CR	...	#AUD-LVL 2,X, -50CR	-50dB
⋮		⋮		⋮	
#AUD-LVL 2,1, 0CR	...	#AUD-LVL 2,5, 0CR	...	#AUD-LVL 2,X, 0CR	0dB
⋮		⋮		⋮	
#AUD-LVL 2,1, 13CR	...	#AUD-LVL 2,5, 13CR	...	#AUD-LVL 2,X, 7CR	+7dB (Max)

* Where X is the output number from 1 - 8. For example, for channel 7 and relative level -50dB, **#AUD-LVL 2,7, -50CR**

13 Table of Hex Codes for Serial Communication (Protocol 2000)

The Hex codes listed in this section are used to set video channels for a single machine (set as Machine 1) connected via either RS-232 or Ethernet. Similar hex codes are used when the **VP-4x8AK** is connected via RS-485 and the machine is set to number 2.

Table 10 lists the Hex codes that switch video channels:

Table 10: VP-4x8AK Hex Codes for Switching via RS-232/RS-485

	Switching Video Channels							
	OUT 1	**OUT 2**	**OUT 3**	**OUT 4**	**OUT 5**	**OUT 6**	**OUT 7**	**OUT 8**
IN 1	01 81 81 81	01 81 82 81	01 81 83 81	01 81 84 81	01 81 85 81	01 81 86 81	01 81 87 81	01 81 88 81
IN 2	01 82 81 81	01 82 82 81	01 82 83 81	01 82 84 81	01 82 85 81	01 82 86 81	01 82 87 81	01 82 88 81
IN 3	01 83 81 81	01 83 82 81	01 83 83 81	01 83 84 81	01 83 85 81	01 83 86 81	01 83 87 81	01 83 88 81
IN 4	01 84 81 81	01 84 82 81	01 84 83 81	01 84 84 81	01 84 85 81	01 84 86 81	01 84 87 81	01 84 88 81

Table 11 lists the Hex codes that switch video channels:

Table 11: VP-4x8AK Hex Codes for Switching Audio Channels via RS-232/RS-485

	Switching Audio Channels							
	OUT 1	**OUT 2**	**OUT 3**	**OUT 4**	**OUT 5**	**OUT 6**	**OUT 7**	**OUT 8**
IN 1	02 81 81 81	02 81 82 81	02 81 83 81	02 81 84 81	02 81 85 81	02 81 86 81	02 81 87 81	02 81 88 81
IN 2	02 82 81 81	02 82 82 81	02 82 83 81	02 82 84 81	02 82 85 81	02 82 86 81	02 82 87 81	02 82 88 81
IN 3	02 83 81 81	02 83 82 81	02 83 83 81	02 83 84 81	02 83 85 81	02 83 86 81	02 83 87 81	02 83 88 81
IN 4	02 84 81 81	02 84 82 81	02 84 83 81	02 84 84 81	02 84 85 81	02 84 86 81	02 84 87 81	02 84 88 81

Table 12 lists the Hex codes that increase or decrease the audio input gain:

Table 12: VP-4x8AK Hex Codes for Increasing/Decreasing the Audio Input Gain

	IN 1	**IN 2**	**IN 3**	**IN 4**
Increase	18 81 86 81	18 82 86 81	18 83 86 81	18 84 86 81
Decrease	18 81 87 81	18 82 87 81	18 83 87 81	18 84 87 81

Table 13 lists the Hex values that set the audio input gain:

Table 13: VP-4x8AK Hex Codes for Setting the Audio Input Gain

IN 1	**IN 2**	**IN 3**	**IN 4**	**Level [Rel]**
16 81 80* 81	16 82 80* 81	16 83 80* 81	16 84 80* 81	Mute
⋮	⋮	⋮	⋮	
16 81 87* 81	16 82 87* 81	16 83 87* 81	16 84 87* 81	-100dB Mute
⋮	⋮	⋮	⋮	
16 81 B9* 81	16 82 B9* 81	16 83 B9* 81	16 84 B9* 81	-50dB
⋮	⋮	⋮	⋮	
16 81 EB* 81	16 82 EB* 81	16 83 EB* 81	16 84 EB* 81	0dB
⋮	⋮	⋮	⋮	
16 81 FF* 81	16 82 FF* 81	16 83 FF* 81	16 84 FF* 81	+20dB (Max)

* BYTE 3 = 0x80 + Gain Value (0x00-0x7F)

Table 14 lists the Hex codes that increase or decrease the audio output gain:

Table 14: VP-4x8AK Hex Codes for Increasing/Decreasing the Output Gain

	OUT 1	**OUT 2**	**OUT 3**	**OUT 4**	**OUT 5**	**OUT 6**	**OUT 7**	**OUT 8**
Increase	18 81 80 81	18 82 80 81	18 83 80 81	18 84 80 81	18 85 80 81	18 86 80 81	18 87 80 81	18 88 80 81
Decrease	18 81 81 81	18 82 81 81	18 83 81 81	18 84 81 81	18 85 81 81	18 86 81 81	18 87 81 81	18 88 81 81

Table 15 lists the Hex codes that set the audio output gain.

Before sending the any of the codes in Table 15, the command 2A 87 80 81 must be sent.

Table 15: VP-4x8AK Hex Codes for Setting the Audio Output Gain

OUT 1	OUT 2	OUT 3	OUT 4	OUT 5	OUT 6	OUT 7	OUT 8	Level [Rel]
16 81 80* 81	16 82 80* 81	16 83 80* 81	16 84 80* 81	16 85 80* 81	16 86 80* 81	16 87 80* 81	16 88 80* 81	Mute
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	
16 81 94* 81	16 82 94* 81	16 83 8D* 81	16 84 94* 81	16 85 94* 81	16 86 94* 81	16 87 94* 81	16 88 94* 81	-100dB Mute
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	
16 81 C6* 81	16 82 C6* 81	16 83 C6* 81	16 84 C6* 81	16 85 C6* 81	16 86 C6* 81	16 87 C6* 81	16 88 C6* 81	-50dB
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	
16 81 F8* 81	16 82 F8* 81	16 83 F8* 81	16 84 F8* 81	16 85 F8* 81	16 86 F8* 81	16 87 F8* 81	16 88 F8* 81	0dB
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	
16 81 FF* 81	16 82 FF* 81	16 83 FF* 81	16 84 FF* 81	16 85 FF* 81	16 86 FF* 81	16 87 FF* 81	16 88 FF* 81	+7dB (Max)

*BYTE 3 = 0x80 + Gain Value (0x00-0x7F)

14 Kramer Protocol

By default, the **VP-4x8AK** is set to protocol 3000 (see Section 14.2) but is also compatible with Kramer's Protocol 2000[1] (see Section 14.3). Section 14.1 describes how to switch between protocol 3000 and protocol 2000.

14.1 Switching Protocols

You can switch protocols either via the front panel buttons (see Section 14.1.1) or the protocol commands (see Section 14.1.2).

14.1.1 Switching Protocols via the Front Panel Buttons

To switch from protocol 3000 to protocol 2000, press and hold[2] the OUT 1 and OUT 2 buttons for a few seconds.
The display shows 2000.

To switch from protocol 2000 to protocol 3000, press and hold the OUT 1 and OUT 3 buttons for a few seconds.
The display shows 3000.

14.1.2 Switching Protocols via Protocol Commands

To switch from protocol 3000 to protocol 2000, send the following command:

#P2000<CR>

To switch from protocol 2000 to protocol 3000, send the following command:

0x38, 0x80, 0x83, 0x81

The Windows®-based Kramer control software[3] operates with protocol 2000. If the **VP-4x8AK** is set to protocol 3000, it is automatically switched to protocol 2000.

14.2 Kramer Protocol 3000

This RS-232/RS-485 communication protocol lets you control the machine from any standard terminal software (for example, Windows® HyperTerminal Application) and uses a data rate of 115200 baud, with no parity, 8 data bits, and 1 stop bit.

1 You can download our user-friendly "Software for Calculating Hex Codes for Protocol 2000" from the technical support section on our Web site at: http://www.kramerelectronics.com

2 Not as part of a switching operation

3 Download the latest software from our Web site at http://www.kramerelectronics.com

14.2.1 Protocol 3000 Syntax

Host message format:

Start	Address (optional)	Body	Delimiter
#	*Destination_id@*	message	CR

Simple command (commands string with only one command without addressing):

start	body	delimiter
#	Command SP Parameter_1,Parameter_2,…	CR

Commands string (formal syntax with commands concatenation and addressing):

*# Address***@ Command_1** *Parameter1_1,Parameter1_2,… |Command_2 Parameter2_1,Parameter2_2,… |Command_3 Parameter3_1,Parameter3_2,… |…***CR**

Device message format:

Start	Address (optional)	Body	Delimiter
~	*Sender_id@*	message	CR LF

Device long response (**Echoing command**):

Start	Address (optional)	Body	Delimiter
~	*Sender_id@*	**command** SP **[***param1 ,param2* **…]** result	CR LF

CR = Carriage return (ASCII 13 = 0x0D)

LF = Line feed (ASCII 10 = 0x0A)

SP = Space (ASCII 32 = 0x20)

14.2.2 Command Parts Details

Command:
Sequence of ASCII letters ('A'-'Z', 'a'-'z' and '-').
Command will separate from parameters with at least single space.

Parameters:
Sequence of Alfa-Numeric ASCII chars ('0'-'9','A'-'Z','a'-'z' and some special chars for specific commands), parameters will be separated by commas.

Message string:
Every command must to be entered as part of message string that begin with **message starting char** and end with **message closing char**, note that string can contain more then one command separated by pipe ("|") char.

Message starting char:
'#' for host command\query.
'~' for machine response.

Device address (Optional, for Knet):
Knet Device ID follow by '@' char.
Query sign = '?', will follow after some commands to define query request.

Message closing char =
Host messages - Carriage Return (ASCII 13), will be referred to by **CR** in this document.
Machine messages - Carriage Return (ASCII 13) + Line-Feed (ASCII 10), will be referred to by **CRLF**.
Spaces between parameters or command parts will be ignored.

Commands chain separator char:
When **message string** contains more than one command, commands will be separated by pipe ("|").

Commands entering:
If terminal software used to connect over serial \ ethernet \ USB port, that possible to directly enter all commands characters (CR will be entered by Enter key, that key send also LF, but this char will be ignored by commands parser).
Sending commands from some controllers (like Crestron) require coding some characters in special form (like \X##). Anyway, there is a way to enter all ASCII characters, so it is possible to send all commands also from controller.
(Similar way can use for URL \ Telnet support that maybe will be added in future).

Commands forms:
Some commands have short name syntax beside the full name to allow faster typing, response is always in long syntax.

Commands chaining:
It is possible to enter multiple commands in same string by '|' char (pipe).
In this case the **message starting char** and the **message closing char** will be entered just one time, in the string beginning and at the end.
All the commands in string will not execute until the closing char will be entered.
Separate response will be sent for every command in the chain.

Input string max length:
64 characters.

Backward support:
Design note: transparent supporting for protocol 2000 will be implemented by switch protocol command from protocol 3000 to protocol 2000, in protocol 2000 there is already such a command to switch protocol to ASCII protocol (#56 : H38 H80 H83 H81).

Table 16: Instruction Codes for Protocol 3000

Help commands		
Command	**Syntax**	**Response**
Protocol Handshaking	#CR	~OK CRLF

Device initiated messages	
Command	**Syntax**
Start message	Kramer Electronics LTD. , **Device Model** Version **Software Version**
Switcher actions	
Audio-video channel has switched (AFV mode)	**AV** *IN>OUT*
Video channel has switched (Breakaway mode)	**VID** *IN>OUT*
Audio channel has switched (Breakaway mode)	**AUD** *IN>OUT*

Result codes (errors)	
	Syntax
No error. Command running succeeded	COMMAND PARAMETERS **OK**
Protocol Errors	
Syntax Error	**ERR001**
Command not available for this device	**ERR002**
Parameter is out of range	**ERR003**
Unauthorized access (running command without the match login).	**ERR004**

Basic routing commands		
Command	**Syntax**	**Response**
Switch audio & video	**AV** *IN*>*OUT*, *IN*>*OUT*, …	**AV** *IN*>*OUT*, *IN*>*OUT*,…*RESULT*
Switch video only	**VID** *IN*>*OUT*, *IN*>*OUT*, … **Short form**: **V** *IN*>*OUT*, *IN*>*OUT*, …	**VID** *IN*>*OUT*, *IN*>*OUT*, …*RESULT*
Note: When AFV mode is active, this command will switch also audio. If audio is breakaway – device display mode will change to show audio connections status.		
Switch audio only	**AUD** *IN*>*OUT*, *IN*>*OUT*, … **Short form**: **A** *IN*>*OUT*, *IN*>*OUT*, …	**AUD** *IN*>*OUT*, *IN*>*OUT*, …*RESULT*
Note: When AFV mode is active, this command will switch also video.		
Read video connection	**VID?** *OUT* **Short form**: **V?** *OUT* **VID? ***	**VID** *IN>OUT* **VID** *IN*>**1**, *IN*>**2**, …
Read audio connection	**AUD?** *OUT* **Short form**: **A?** *OUT* **AUD? ***	**AUD** *IN*>*OUT* **AUD** *IN*>**1**, *IN*>**2**, …
Parameters Description: **iN** = Input number or '0' to disconnect output. '>' = Connection character between in and out parameters. **OUT** = Output number or '*' for all outputs.		
Examples:		
Switch Video and Audio input 3 to output 7	#AV 3>7**CR**	~AV 3>7 OK**CRLF**
Switch Video input 2 to output 4	#V 2>4**CR**	~VID 2>4 OK**CRLF**
Switch Video input 4 to output 2 in machine number 6	#6@VID 4>2**CR**	~6@VID 4>2 OK**CRLF**
Disconnect Video and Audio Output 4	#AV 0>4**CR**	~AV 0>4 OK**CRLF**
Switch Video Input 3 to All Outputs	#V 3>***CR**	~VID 3>* OK**CRLF**
Chaining Multiple commands*	#AV 1>* | V 3>4, 2>2, 82>1, 0>2 |V 82>3| A 0>1 | V? * **CR** First switch all Audio and video outputs from input 1, **Then switch video input 3 to output 4, video input 2 to output 2, video input and disconnect video output 2.** Then switch audio input 3 to output 2, Then disconnect audio output 1. Then get status of all links (assume this is 4x4 matrix). Commands processing start after entering **CR**, response will sent for each command after processing it.	~AV 1>* OK**CRLF** ~VID 1>2, 3>4 OK**CRLF** ~VID 82>3 **ERR###** **CRLF** ~AUD 0>1 OK**CRLF** ~V 1>1, 0>2, 1>3, 3>4 **CRLF**

Signal Status commands		
Command	**Syntax**	**Response**
Change signal status	----------	**SIGNAL** *INPUT*, *STATUS*
Get signal status	**SIGNAL?** *INPUT*	**SIGNAL** *INPUT*, *STATUS*

Parameters Description:
INPUT = Input number, '*' for all.
STATUS = Signal state:
"0" or "off" for not existent signal.
"1" or "on" for existent signal.

Preset commands		
Command	**Syntax**	**Response**
Store current connections to preset	**PRST-STO** *PRESET* **Short form**: **PSTO** *PRESET*	**PRST-STO** *PRESET* *RESULT*
Recall saved preset	**PRST-RCL** *PRESET* **Short form: PRCL** *PRESET*	**PRST-RCL** *PRESET* *RESULT*
Delete saved preset	**PRST-DEL** *PRESET* **Short form: PDEL** *PRESET*	**PRST-DEL** *PRESET* *RESULT*
Read video connections from saved preset	**PRST-VID?** *PRESET*,*OUT* **Short form: PVID?** *PRESET*,*OUT* **PRST-VID?** *PRESET*, *	**PRST-VID** *PRESET*, *IN*>*OUT* **PRST-VID** *PRESET*, *IN*>*1*, *IN*>2,…
Read audio connections from saved preset	**PRST-AUD?** *PRESET*,*OUT* **Short form: PAUD?** *PRESET*,*OUT* **PRST-AUD?** *PRESET*, *	**PRST-AUD** *PRESET*: *IN*>*OUT* **PRST-AUD** *PRESET*: *IN*>**1**, *IN*>**2**,…
Read saved presets list	**PRST-LST?** **Short form: PLST?**	**PRST-LST** *PRESET*, *PRESET*, …
Parameters Description: **PRESET** = Preset number. **OUT** = Output in preset to show for, '*' for all.		

Examples:		
Store current Audio & Video connections to preset 5	#PRST-STR 5**CR**	~PRST-STR 5 OK**CRLF**
Recall Audio & Video connections from preset 3	#PRCL 3**CR**	~PRST-RCL 3 OK**CRLF**
Show source of video output 2 from preset 3	#PRST-VID? 3,2**CR**	~PRST-VID 3: 4>2 **CRLF**

Operation commands		
Command	**Syntax**	**Response**
Lock front panel	**LOCK-FP** *LOCK-MODE* **Short form: LCK** *LOCK-MODE*	**LOCK-FP** *LOCK-MODE* *RESULT*
Get front panel locking state	**LOCK-FP?**	**LOCK-FP** *LOCK-MODE*
Parameters Description: **LOCK-MODE** **=** Front panel locking state: "0" or "off" to unlock front panel buttons. "1" or "on" to lock front panel buttons.		

Restart device	**RESET**	**RESET OK**
Switch to protocol 2000*	**P2000**	**P2000 OK**
* Protocol 2000 has command to switch back to ASCII protocol (like protocol 3000)		

Audio parameters commands		
Command	**Syntax**	**Response**
Set audio level in specific amplifier stage.	**AUD-LVL** *STAGE*, *CHANNEL*, *VOLUME* **Short form: ADL** *STAGE*, *CHANNEL*, *VOLUME*	**AUD-LVL** *STAGE*, *CHANNEL*, *VOLUME* *RESULT*
Read audio volume level	**AUD-LVL?** *STAGE*, *CHANNEL* **Short form: ADL?** *STAGE*	**AUD-LVL** *STAGE*, *CHANNEL*, *VOLUME*

Parameters Description:

STAGE =
"In","Out"
or
Numeric value (present audio processing stage). For example: "0" for Input level, "1" for Pre-Amplifier, "2" for Amplifier (Out) etc.

CHANNEL = Input or Output #

VOLUME = Audio parameter in Kramer units, precede minus sign for negative values.
++ increase current value,
-- decrease current value.

Machine info commands		
Command	**Syntax**	**Response**
* Time settings commands require admin authorization		
Read in\outs count	**INFO-IO?**	**INFO-IO: IN** *INPUTS_COUNT*, **OUT** *OUTPUTS_COUNT*
Read max presets count	**INFO-PRST?**	**INFO-PRST: VID** *PRESET_VIDEO_COUNT*, **AUD** *PRESET_AUDIO_COUNT*
Reset configuration to factory default	**FACTORY**	**FACTORY** *RESULT*

Identification commands		
Command	**Syntax**	**Response**
Protocol Handshaking	#**CR**	**~OK CRLF**
Read device model	**MODEL?**	**MODEL** *MACHINE_MODEL*
Read device serial number	**SN?**	**SN** *SERIAL_NUMBER*
Read device firmware version	**VERSION?**	**VERSION** *MAJOR*.*MINOR*.*BUILD*.*REVISION*
Set machine name	**NAME** *MACHINE_NAME*	**NAME** *MACHINE_NAME* *RESULT*

Identification commands		
Command	**Syntax**	**Response**
Read machine name	**NAME?**	**NAME** *MACHINE_NAME*
Reset machine name to factory default*	**NAME-RST**	**NAME-RST** *MACHINE_FACTORY_NAME* *RESULT*
*Note: machine name not equal to model name. This name relevance for site viewer identification of specific machine or for network using (with DNS feature on). *MACHINE_NAME* = Up to 14 Alfa-Numeric chars. * **Machine factory name =** Model name + last 4 digits from serial number.		
Set machine id number	**MACH-NUM** *MACHINE_NUMBER*	**MACH-NUM** *OLD_MACHINE_NUMBER* ,*NEW_MACHINE_NUMBER* *RESULT*
* Response will send after machine number has been changed. So the replay with header will be: *NEW_MACHINE_NUMBER* @**MACH-NUM** *OLD_MACHINE_NUMBER* ,*NEW_MACHINE_NUMBER* **OK**		

Network settings commands		
Set IP Address	**NET-IP** *IP_ADDRESS* **NTIP**	**NET-IP** *IP_ADDRESS* *RESULT*
Read IP Address	**NET-IP?** **NTIP**?	**NET-IP** *IP_ADDRESS*
Read MAC Address	**NET-MAC?** **NTMC**	**NET-MAC** *MAC_ADDRESS*
Set subnet mask	**NET-MASK** *SUBNET_MASK* **NTMSK**	**NET-MASK** *SUBNET_MASK* *RESULT*
Read subnet mask	**NET-MASK?** **NTMSK?**	**NET-MASK** *SUBNET_MASK*
Set gateway address	**NET-GATE** *GATEWAY_ADDRESS* **NTGT**	**NET-GATE** *GATEWAY_ADDRESS* *RESULT*
Read subnet mask	**NET-GATE?** **NTGT?**	**NET-GATE** *GATEWAY_ADDRESS*
Set DHCP mode	**NET-DHCP** *DHCP_MODE* **NTDH**	**NET-DHCP** *DHCP_MODE* *RESULT*
Read subnet mask	**NET-DHCP?** **NTDH?**	**NET-DHCP** *DHCP_MODE*
DHCP_MODE = 0 – Don't use DHCP (Use IP set by factory or IP set command). 1 – Try to use DHCP, if unavailable use IP as above.		
Change protocol ethernet port	**ETH-PORT** *PROTOCOL* , *PORT* **ETHP**	**ETH-PORT** *PROTOCOL* ,*PORT* *RESULT*
Read protocol ethernet port	**ETH-PORT?** *PROTOCOL* **ETHP?**	**ETH-PORT** *PROTOCOL* , *PORT*
PROTOCOL = TCP / UDP (transport layer protocol) *PORT* = ethernet port to enter protocol 3000 commands. 1-65535 = User defined port 0 - reset port to factory default (50000 for UDP, 5000 for TCP)		

Advanced switching commands		
Command	**Syntax**	**Response**
Set audio follow video mode	**AFV** *AFV-MODE*	**AFV** *AFV-MODE* *RESULT*
Note: This command effect device front-panel mode and AUD\VID command.		
Read audio follow video mode	**AFV?**	**AFV** *AFV-MODE*

AFV-MODE = Front panel AFV mode
"0" or "afv" to set front panel switching buttons in audio-follow-video state.
"1" or "brk" to set front panel switching buttons in their previous state when audio.

14.3 Kramer Protocol 2000

This RS-232/RS-485 communication protocol uses four bytes of information as defined below. The default data rate is 9600 baud, with no parity, 8 data bits and 1 stop bit.

Table 17: Protocol Definitions

MSB							**LSB**
	DESTI-NATION	**INSTRUCTION**					
0	D	N5	N4	N3	N2	N1	N0
7	6	5	4	3	2	1	0
1st byte							
	INPUT						
1	I6	I5	I4	I3	I2	I1	I0
7	6	5	4	3	2	1	0
2nd byte							
	OUTPUT						
1	O6	O5	O4	O3	O2	O1	O0
7	6	5	4	3	2	1	0
3rd byte							
			MACHINE NUMBER				
1	OVR	X	M4	M3	M2	M1	M0
7	6	5	4	3	2	1	0
4th byte							

1st BYTE: Bit 7 – Defined as 0.
D – "DESTINATION": 0 - for sending information to the switchers (from the PC);
1 - for sending to the PC (from the switcher).
N5…N0 – "INSTRUCTION"
The function that is to be performed by the switcher(s) is defined by the INSTRUCTION (6 bits). Similarly, if a function is performed via the machine's keyboard, then these bits are set with the INSTRUCTION NO., which was performed. The instruction codes are defined according to the table below (INSTRUCTION NO. is the value to be set for N5…N0).

2nd BYTE: Bit 7 – Defined as 1.
I6…I0 – "INPUT".
When switching (ie. instruction codes 1 and 2), the INPUT (7 bits) is set as the input number which is to be switched. Similarly, if switching is done via the machine's front-panel, then these bits are set with the INPUT NUMBER which was switched. For other operations, these bits are defined according to the table.

3rd BYTE: Bit 7 – Defined as 1.
O6…O0 – "OUTPUT".

When switching (ie. instruction codes 1 and 2), the OUTPUT (7 bits) is set as the output number which is to be switched. Similarly, if switching is done via the machine's front-panel, then these bits are set with the OUTPUT NUMBER which was switched. For other operations, these bits are defined according to the table.

4th BYTE: Bit 7 – Defined as 1.
Bit 5 – Don't care.
OVR – Machine number override.
M4…M0 – MACHINE NUMBER.

Used to address machines in a system via their machine numbers. When several machines are controlled from a single serial port, they are usually configured together with each machine having an individual machine number. If the OVR bit is set, then all machine numbers will accept (implement) the command, and the addressed machine will reply.
For a single machine controlled via the serial port, always set M4…M0 = 1, and make sure that the machine itself is configured as MACHINE NUMBER = 1.

Table 18: Instruction Codes for Protocol 2000

Note: All values in the table are decimal, unless otherwise stated.

INSTRUCTION		DEFINITION FOR SPECIFIC INSTRUCTION		NOTE
#	DESCRIPTION	INPUT	OUTPUT	
0	RESET VIDEO	0	0	1
1	SWITCH VIDEO	Set equal to video input which is to be switched (0 = disconnect)	Set equal to video output which is to be switched (0 = to all the outputs)	2
2	SWITCH AUDIO	Set equal to audio input which is to be switched (0 = disconnect)	Set equal to audio output which is to be switched (0 = to all the outputs)	2
3	STORE VIDEO STATUS	Set as SETUP #	0 - to store 1 - to delete	2, 3
4	RECALL VIDEO STATUS	Set as SETUP #	0	2, 3
5	REQUEST STATUS OF A VIDEO OUTPUT	Set as SETUP #	Equal to output number whose status is reqd	4, 3
6	REQUEST STATUS OF AN AUDIO OUTPUT	Set as SETUP #	Equal to output number whose status is reqd	4, 3
8	BREAKAWAY SETTING	0	0 - audio-follow-video 1 - audio breakaway	2
11	REQUEST BREAKAWAY SETTING	Set as SETUP #	0 - Request audio breakaway setting	3, 4, 6
15	REQUEST WHETHER SETUP IS DEFINED / VALID INPUT IS DETECTED	SETUP # or Input #	0 - for checking if setup is defined 1 - for checking if input is valid	8
16	ERROR / BUSY	For invalid / valid input (i.e. OUTPUT byte = 4 or OUTPUT byte = 5), this byte is set as the input #	0 - error 1 - invalid instruction 2 - out of range 3 - machine busy 4 - invalid input 5 - valid input 6 - RX buffer overflow	9, 25
22	SET AUDIO PARAMETER	Equal to input / output number whose parameter is to be set (0 = all)	Set as parameter value	2, 24
24	INCREASE / DECREASE AUDIO PARAMETER	Equal to input / output number whose parameter is to be increased / decreased (0 = all)	0 - increase output 1 - decrease output 2 - increase left output 3 - decrease left output 4 - increase right output 5 - decrease right output 6 - increase input 7 - decrease input 8 - increase left input 9 - decrease left input 10 -increase right input 11 - decrease right input	2
25	REQUEST AUDIO PARAMETER	Equal to input / output number whose parameter is requested	0	6, 24
30	LOCK FRONT PANEL	0 - Panel unlocked 1 - Panel locked	0	2

INSTRUCTION		DEFINITION FOR SPECIFIC INSTRUCTION		NOTE
#	DESCRIPTION	INPUT	OUTPUT	
31	REQUEST WHETHER PANEL IS LOCKED	0	0	16
42	AUDIO PARAMETER SETTINGS FOR INSTRUCTIONS 22, 25	INPUT Bit: I0 - 0=input; 1=output		24
56	CHANGE TO ASCII	0	Kramer protocol 3000	19
61	IDENTIFY MACHINE	1 - video machine name 2 - audio machine name 3 - video software version 4 - audio software version	0 - Request first 4 digits 1 - Request first suffix 2 - Request second suffix 3 - Request third suffix 10 - Request first prefix 11 - Request second prefix 12 - Request third prefix	13
62	DEFINE MACHINE	1 - number of inputs 2 - number of outputs 3 - number of setups	1 - for video 2 - for audio	14

NOTES on the above table:

NOTE 1 - When the master switcher is reset, (e.g. when it is turned on), the reset code is sent to the PC. If this code is sent to the switchers, it will reset according to the present power-down settings.

NOTE 2 - These are bi-directional definitions. That is, if the switcher receives the code, it will perform the instruction; and if the instruction is performed (due to a keystroke operation on the front panel), then these codes are sent. For example, if the HEX code

01 85 88 83

was sent from the PC, then the switcher (machine 3) will switch input 5 to output 8. If the user switched input 1 to output 7 via the front panel keypad, then the switcher will send HEX codes:

41 81 87 83

to the PC.

When the PC sends one of the commands in this group to the switcher, then, if the instruction is valid, the switcher replies by sending to the PC the same four bytes that it was sent (except for the first byte, where the DESTINATION bit is set high).

NOTE 3 - SETUP # 0 is the present setting. SETUP # 1 and higher are the settings saved in the switcher's memory, (i.e. those used for Store and Recall).

NOTE 4 - The reply to a "REQUEST" instruction is as follows: the same instruction and INPUT codes as were sent are returned, and the OUTPUT is assigned the value of the requested parameter. The replies to instructions 10 and 11 are as per the definitions in instructions 7 and 8 respectively. For example, if the present status of machine number 5 is breakaway setting, then the reply to the HEX code

0B 80 80 85

would be HEX codes

4B 80 81 85

NOTE 6 – If INPUT is set to 127 for these instructions, then, if the function is defined on this machine, it replies with OUTPUT=1. If the function is not defined, then the machine replies with OUTPUT=0, or with an error (invalid instruction code).

If the INPUT is set to 126 for these instructions, then, if possible, the machine will return the current setting of this function, even for the case that the function is not defined. For example, for a video switcher which always switches during the VIS of input #1, (and its VIS setting cannot be programmed otherwise), the reply to the HEX code

0A FE 80 81 (ie. request VIS setting, with INPUT set as 126dec)

would be HEX codes

4A FE 81 81 (ie. VIS setting = 1, which is defined as VIS from input #1).

NOTE 8 - The reply is as in TYPE 3 above, except that here the OUTPUT is assigned with the value 0 if the setup is not defined / no valid input is detected; or 1 if it is defined / valid input is detected.

NOTE 9 - An error code is returned to the PC if an invalid instruction code was sent to the switcher, or if a parameter associated with the instruction is out of range (e.g. trying to save to a setup greater than the highest one, or trying to switch an input or output greater than the highest one defined). This code is also returned to the PC if an RS-232 instruction is sent while the machine is being programmed via the front panel. Reception of this code by the switcher is not valid.

NOTE 10 – This code is reserved for internal use.

NOTE 13 - This is a request to identify the switcher/s in the system. If the OUTPUT is set as 0, and the INPUT is set as 1, 2, 5 or 7, the machine will send its name. The reply is the decimal value of the INPUT and OUTPUT. For example, for a 2216, the reply to the request to send the audio machine name would be (HEX codes):

7D 96 90 81 (i.e. 128dec+ 22dec for 2nd byte, and 128dec+ 16dec for 3rd byte).

If the request for identification is sent with the INPUT set as 3 or 4, the appropriate machine will send its software version number. Again, the reply would be the decimal value of the INPUT and OUTPUT - the INPUT representing the number in front of the decimal point, and the OUTPUT representing the number after it. For example, for version 3.5, the reply to the request to send the version number would be (HEX codes):

7D 83 85 81 (i.e. 128dec+ 3dec for 2nd byte, 128dec+ 5dec for 3rd byte).

If the OUTPUT is set as 1, then the ASCII coding of the lettering following the machine's name is sent. For example, for the VS-7588YC, the reply to the request to send the first suffix would be (HEX codes):

7D D9 C3 81 (i.e. 128dec+ ASCII for "Y"; 128dec+ ASCII for "C").

NOTE 14 - The number of inputs and outputs refers to the specific machine which is being addressed, not to the system. For example, if six 16X16 matrices are configured to make a 48X32 system (48 inputs, 32 outputs), the reply to the HEX code

3E 82 81 82 (ie. request the number of outputs)

would be HEX codes

7E 82 90 82

ie. 16 outputs

NOTE 16 - The reply to the "REQUEST WHETHER PANEL IS LOCKED" is as in NOTE 4 above, except that here the OUTPUT is assigned with the value 0 if the panel is unlocked, or 1 if it is locked.

NOTE 19 – After this instruction is sent, the unit will respond to the ASCII command set defined by the OUTPUT byte. The ASCII command to operate with the HEX command set must be sent in order to return to working with HEX codes.

NOTE 24 – Further information needed in instructions 22 and 25, is sent using instruction 42 – which is sent prior to the instruction. For example, to request the audio gain value of output # 9, send hex codes

2A 81 80 81

and then send HEX codes

19 89 81 81.

To set input gain change mode, send hex codes

2A 80 80 81

and then send HEX codes

16

NOTE 25 – For units which detect the validity of the video inputs, Instruction 16 will be sent whenever the unit detects a change in the state of an input (in real-time).

For example, if input 3 is detected as invalid, the unit will send the HEX codes

10 83 84 81

If input 7 is detected as valid, then the unit will send HEX codes

10 87 85 81.

LIMITED WARRANTY

Kramer Electronics (hereafter *Kramer*) warrants this product free from defects in material and workmanship under the following terms.

HOW LONG IS THE WARRANTY

Labor and parts are warranted for seven years from the date of the first customer purchase.

WHO IS PROTECTED?

Only the first purchase customer may enforce this warranty.

WHAT IS COVERED AND WHAT IS NOT COVERED

Except as below, this warranty covers all defects in material or workmanship in this product. The following are not covered by the warranty:

1. Any product which is not distributed by Kramer, or which is not purchased from an authorized Kramer dealer. If you are uncertain as to whether a dealer is authorized, please contact Kramer at one of the agents listed in the Web site www.kramerelectronics.com.
2. Any product, on which the serial number has been defaced, modified or removed, or on which the WARRANTY VOID IF TAMPERED sticker has been torn, reattached, removed or otherwise interfered with.
3. Damage, deterioration or malfunction resulting from:
   i) Accident, misuse, abuse, neglect, fire, water, lightning or other acts of nature
   ii) Product modification, or failure to follow instructions supplied with the product
   iii) Repair or attempted repair by anyone not authorized by Kramer
   iv) Any shipment of the product (claims must be presented to the carrier)
   v) Removal or installation of the product
   vi) Any other cause, which does not relate to a product defect
   vii) Cartons, equipment enclosures, cables or accessories used in conjunction with the product

WHAT WE WILL PAY FOR AND WHAT WE WILL NOT PAY FOR

We will pay labor and material expenses for covered items. We will not pay for the following:

1. Removal or installations charges.
2. Costs of initial technical adjustments (set-up), including adjustment of user controls or programming. These costs are the responsibility of the Kramer dealer from whom the product was purchased.
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1. To obtain service on you product, you must take or ship it prepaid to any authorized Kramer service center.
2. Whenever warranty service is required, the original dated invoice (or a copy) must be presented as proof of warranty coverage, and should be included in any shipment of the product. Please also include in any mailing a contact name, company, address, and a description of the problem(s).
3. For the name of the nearest Kramer authorized service center, consult your authorized dealer.

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EXCLUSION OF DAMAGES

The liability of Kramer for any effective products is limited to the repair or replacement of the product at our option. Kramer shall not be liable for:

1. Damage to other property caused by defects in this product, damages based upon inconvenience, loss of use of the product, loss of time, commercial loss; or:
2. Any other damages, whether incidental, consequential or otherwise. Some countries may not allow limitations on how long an implied warranty lasts and/or do not allow the exclusion or limitation of incidental or consequential damages, so the above limitations and exclusions may not apply to you.

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This equipment has been tested to determine compliance with the requirements of:

EN-50081:	"Electromagnetic compatibility (EMC); generic emission standard. Part 1: Residential, commercial and light industry"
EN-50082:	"Electromagnetic compatibility (EMC) generic immunity standard. Part 1: Residential, commercial and light industry environment".
CFR-47:	FCC* Rules and Regulations: Part 15: "Radio frequency devices Subpart B Unintentional radiators"

CAUTION!

- Servicing the machines can only be done by an authorized Kramer technician. Any user who makes changes or modifications to the unit without the expressed approval of the manufacturer will void user authority to operate the equipment.
- Use the supplied DC power supply to feed power to the machine.
- Please use recommended interconnection cables to connect the machine to other components.

* FCC and CE approved using STP cable (for twisted pair products)

For the latest information on our products and a list of Kramer distributors, visit our Web site: www.kramerelectronics.com, where updates to this user manual may be found.
We welcome your questions, comments and feedback.

Safety Warning:
Disconnect the unit from the power supply before opening/servicing.

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